



Iraq: Crop Progress Report

MY 2010/11

February Summary

February 26, 2010

- (1) Winter grain crops (wheat & barley) throughout Iraq are currently in rapid vegetative growth stages, as unseasonably warm temperatures in recent weeks have spurred crop development. The latest outlook for national winter grain production is quite favorable, given increased national winter grain acreage and beneficial season-to-date rainfall conditions. Iraqi provincial authorities indicate that national grain area has increased this year, but will not recover to near-normal levels recorded prior to 2008 (Table 1). National wheat area, inclusive of the Kurdish regions, is estimated at 1.47 million hectares (up 22 % from last year, but 22 % below normal), while barley area is estimated at 1.17 million hectares (up 134 % from last year, but down 19 % from normal). These initial acreage reports indicate that national grain production could significantly improve over the past two drought-affected seasons, but also that Iraq is likely to experience a 3rd consecutive below-normal winter grain harvest. During the next two months (March-April) Iraq's winter grains will progress through the most important and moisture sensitive growth stages. This period is when the yield potential of the crop is set, and when prevailing weather conditions and/or irrigation supplies can have a substantially positive or negative influence on both rainfed and irrigated grain production prospects.
- (2) Season-to-date cumulative precipitation throughout Iraq has been very favorable this year, with virtually all major grain growing regions recording near-normal to above-normal rainfall through late February (Figures 1-3). This is a considerable improvement over the past two years, when severe drought conditions predominated. The rainfall pattern was particularly favorable during November and December 2009, during the winter grain planting period. However, January 2010 was very dry, and newly established grain crops relied primarily on soil moisture reserves or supplemental irrigation to maintain growth. Excellent rains returned in February 2010 to most grain areas, with the exception being the Kurdish governorates in northern Iraq. Season-to-date precipitation over southeastern Turkey is much better than the previous two years, with higher than average rains affecting some of the tributaries of both the Euphrates and Tigris Rivers (Figure 4). However, rainfall during the first two decades of February 2010 has been below normal (Figure 5), and regional snowcover and depth at this time is also below normal (Figure 6). This implies that there may not be as much spring snowmelt for Turkish reservoir replenishment, and that water releases from Turkish dams along both the Tigris and Euphrates watersheds may not substantially improve this year. While winter rainfall in Iraq has been favorable, lake levels (stored water resources) have not significantly improved, as is seen with Buhayrat ath-Tharthar (Figure 7). The current lake level has increased since December 2009, but remains well-below normal - at the lowest level in the past 8 years. The governorate of Ninawa bears special mention, in that it has received extremely beneficial rainfall this year. Ninawa is the

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largest single grain producing region of Iraq, typically accounting for 20 percent of the nations' wheat production and 32 percent of its barley output (Appendix – Figures A1-A2). Virtually all of the grain grown in Ninawa is non-irrigated, and highly variable rainfall conditions cause large fluctuations in annual grain production. Given the current moisture status in this governorate, winter grain production prospects are particularly strong in MY2010/11.

- (3) The overall temperature regime in Iraq is heating up, with springtime daily maximum temperatures averaging 70-80 degrees in recent weeks. End of January temperatures were slightly warmer than normal for most of Iraq, with the beginning of February experiencing mostly normal temperatures and mid February being unusually warm (Figure 8). These warmer temperatures will speed crop growth while also increasing crop water demand. The NOAA Climate Prediction Center 7-day rainfall forecast indicates that continued favorable showers are expected in most primary winter grain producing areas (Figure 9), while the 7-day temperature forecast indicates mild near-normal temperatures will prevail (Figure 10).
- (4) A review of satellite-derived vegetative index data (NDVI) indicates that winter grain crops emerged throughout the country and showed widespread early growth during February. At the national level, the vegetation index data analysis indicates that most northern rainfed and southern irrigated crops are showing similar or better crop development than the previous two years, with the exception of Diyala, and Al-Qadisiyah (Figures 11, 12, 13, 14). In particular, the marginal or opportunistically cropped central and western portions of Ninawa are displaying very strong development compared to last year, as are western Dahuk, Arbil, and portions of As-Sulaymaniyah (Figure 15). By comparison, the rainfed cropping regions of southeastern Dahuk and east-central As-Sulaymaniyah are displaying uncharacteristically poor vegetative development, though these northern producing regions have received very favorable winter rainfall. When comparing current crop development to the long-term mean (Figures 16-17) crop establishment in northern Iraq is near to well-above normal, including the core producing areas of Ninawa, Dahuk, Arbil, and As-Sulaymaniyah. In central and southern Iraq, favorable crop establishment compared to last year and the long-term mean is evident in many of the primarily irrigated regions (Figure 18, 19, 20, 21), with the major exception being the governorates of Diyala and Al-Qadisiyah. Small areas in Wasit and Babil are also displaying much less favorable growing conditions than the long-term mean. In general, the differences in early season crop development illustrated in these maps provide a cautionary warning that despite beneficial rainfall so far this year, not all areas are performing well.
- (5) MODIS satellite images of Iraq show that the major winter grain growing regions are greener than last month and last year (Figure 22, 23, 24). This helps confirm that increased rainfall has led to generally favorable crop development nationwide. Comparison of MODIS NDVI Anomaly data with SPOT imagery shows that greener areas are indeed planted with well-established crops (Figure 25). Comparison of high resolution Quickbird satellite imagery acquired last year with SPOT imagery acquired this year over the irrigated grain producing zone in Al-Qadisiyah shows strong improvement over last year in several localized areas of the governorate (Figure 26), indicating that early season irrigation supplies were more prevalent or better utilized by farmers in this particular location. As noted above, this governorate is generally displaying below normal overall development as of late February.

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Similar imagery acquired over At-Tamin (Figure 27) also shows increased winter grain acreage and healthy crop emergence compared to last year.

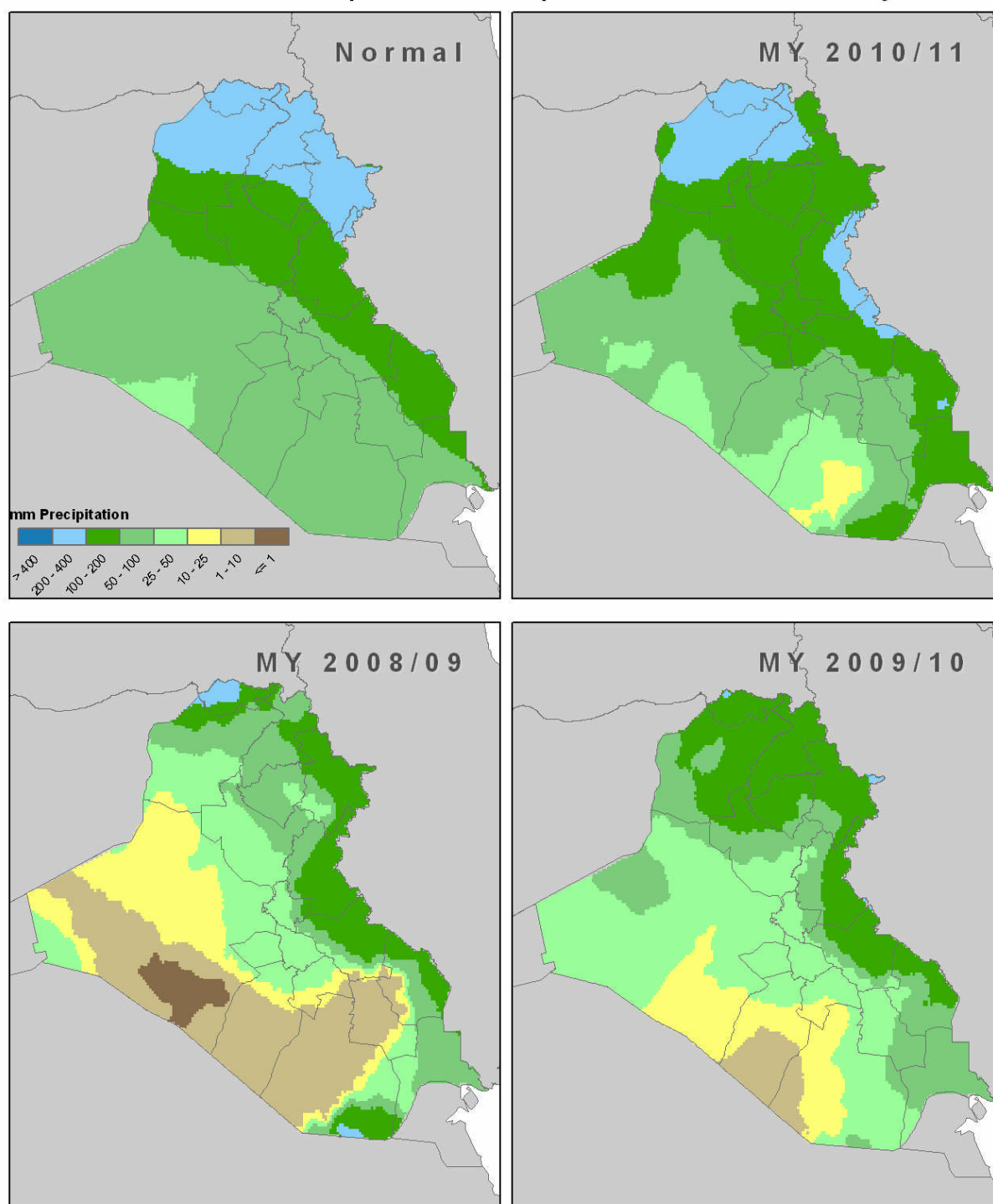
- (6) The appendix contains national production maps for wheat (Figure A1) and barley (Figure A2), the crop calendar for Iraq (Figure A3), and a map of aboveground Iraqi water resources (Figure A4).

Table 1. Change in current Market Year planted area vs. the previous two Market Years and the 5-year average. The Kurdish provinces of Arbil, As-Sulaymaniyah, and Dahuk lumped together under “Kurdish Gov.”

Province	Wheat			Barley		
	MY 2010/11 Planted Area (ha)	MY 2007/08 Harvested Area (ha)	Change	MY 2010/11 Planted Area (ha)	MY 2007/08 Harvested Area (ha)	Change
Kurdish Areas	300,000	340,000	11.8%	300,000	410,000	26.8%
Al Anbar	70,279	56,610	24.1%	5,239	3,000	42.7%
Al Basrah	13,024	16,861	22.7%	2,772	5,000	44.6%
Al Muthanna	11,717	11,242	4.1%	19,280	25,000	22.9%
Al Qadisiyah	83,035	92,408	10.1%	70,009	80,000	12.5%
An Najaf	51,280	49,637	3.2%	2,057	2,000	2.7%
At Ta'min	170,932	205,336	16.8%	39,663	30,000	24.4%
Babil	74,866	65,365	12.7%	23,510	25,000	6.0%
Baghdad	60,178	48,372	19.6%	7,724	5,000	35.3%
Dhi Qar	36,782	59,288	38.0%	56,810	75,000	24.3%
Diyala	28,609	106,180	73.1%	10,164	35,000	71.0%
Karbala	3,573	2,309	35.4%	2,875	3,000	4.2%
Maysan	55,323	94,455	41.4%	54,245	65,000	16.5%
Ninawa	217,205	463,645	53.2%	507,471	615,000	17.5%
Salah ad Din	151,250	107,157	29.2%	14,750	15,000	1.7%
Wasit	140,813	164,245	14.3%	54,825	60,000	8.6%
National	1,468,865	1,883,110	22.0%	1,171,393	1,453,000	19.4%

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Cumulative Precipitation: September 1 - February 20

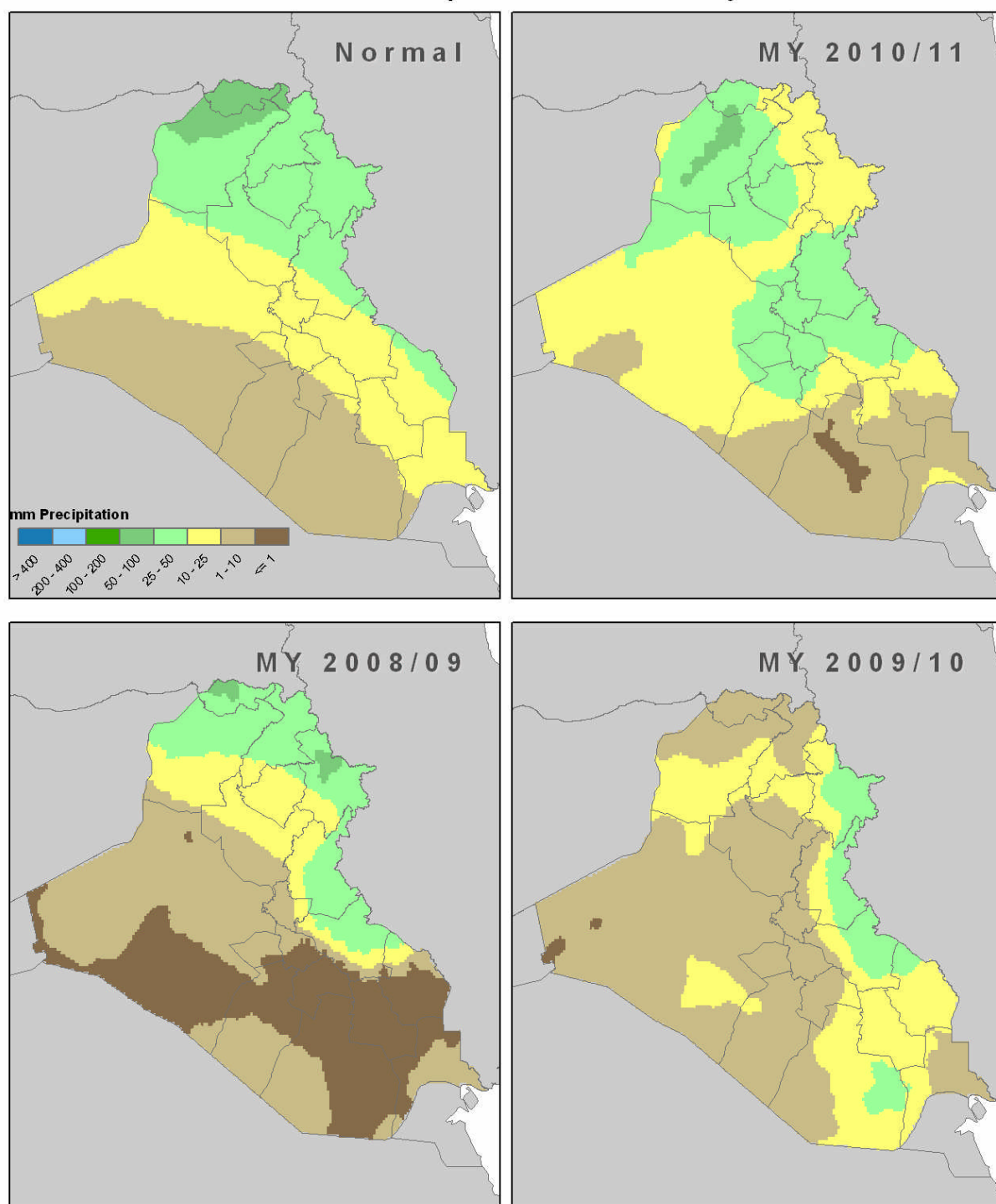


Data Source: AFWA Precipitation
USDA-FAS
Office of Global Analysis



Figure 1. Season to date cumulative precipitation, September 1 to February 20. Current year compared against previous two crop seasons.

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 Cumulative Precipitation: February 1 - 20

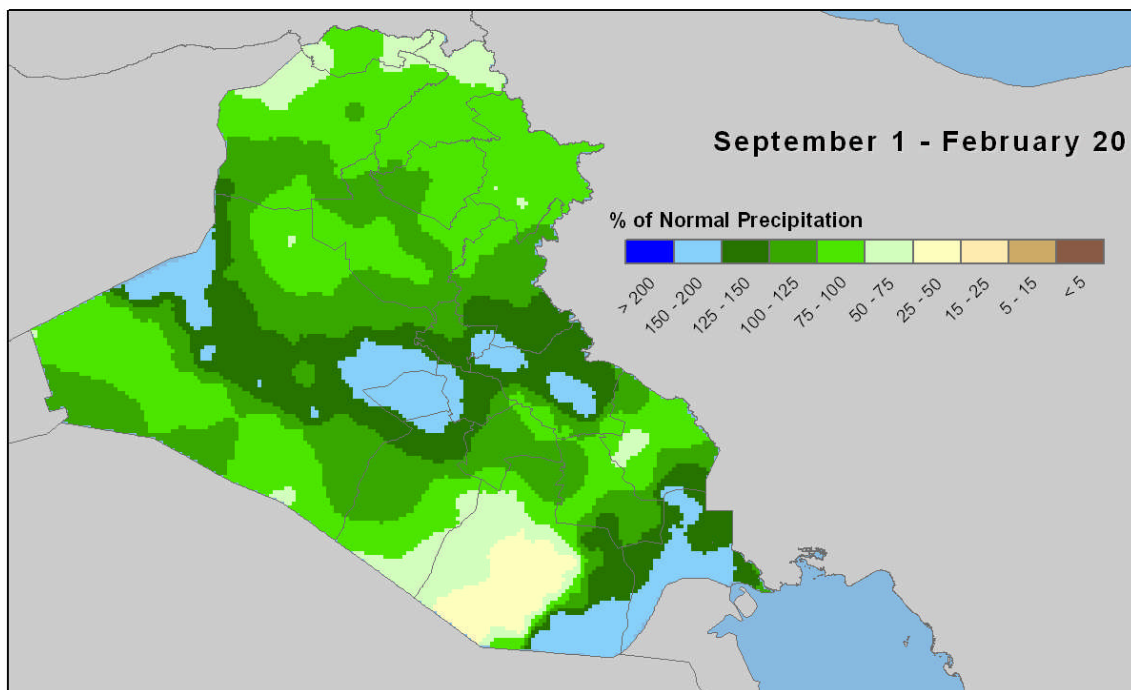
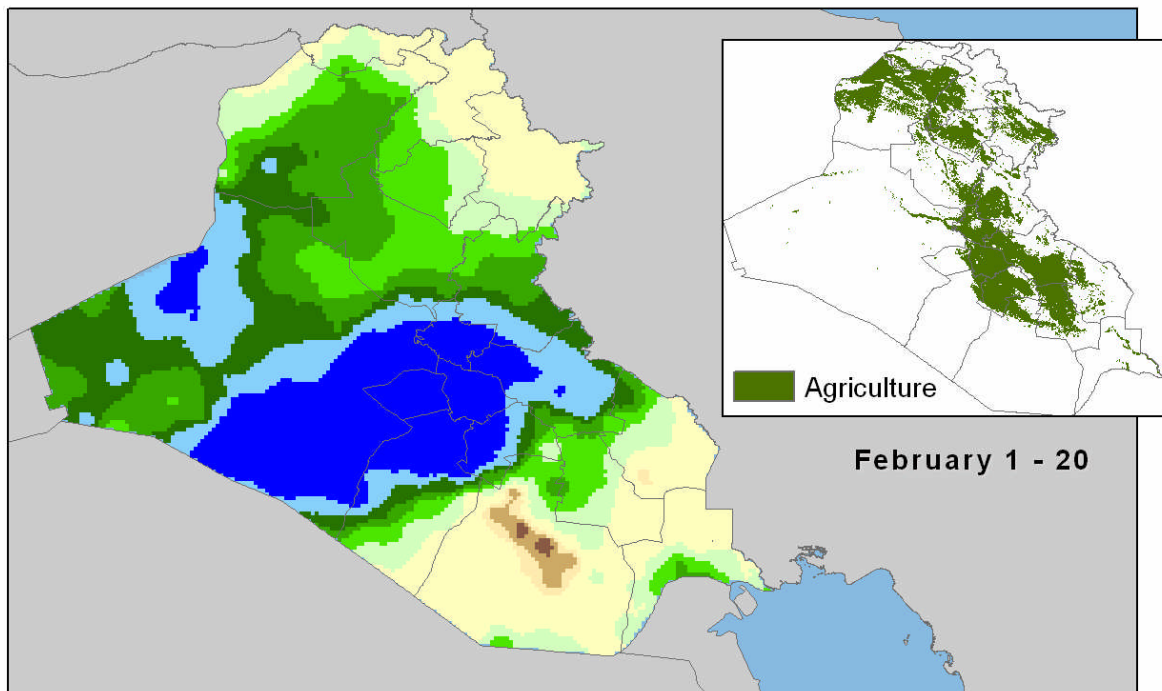


Data Source: AFWA Precipitation
 USDA-FAS
 Office of Global Analysis



Figure 2. Cumulative precipitation, February 1 - 20. Current year compared against previous two crop seasons.

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Percent of Normal Precipitation



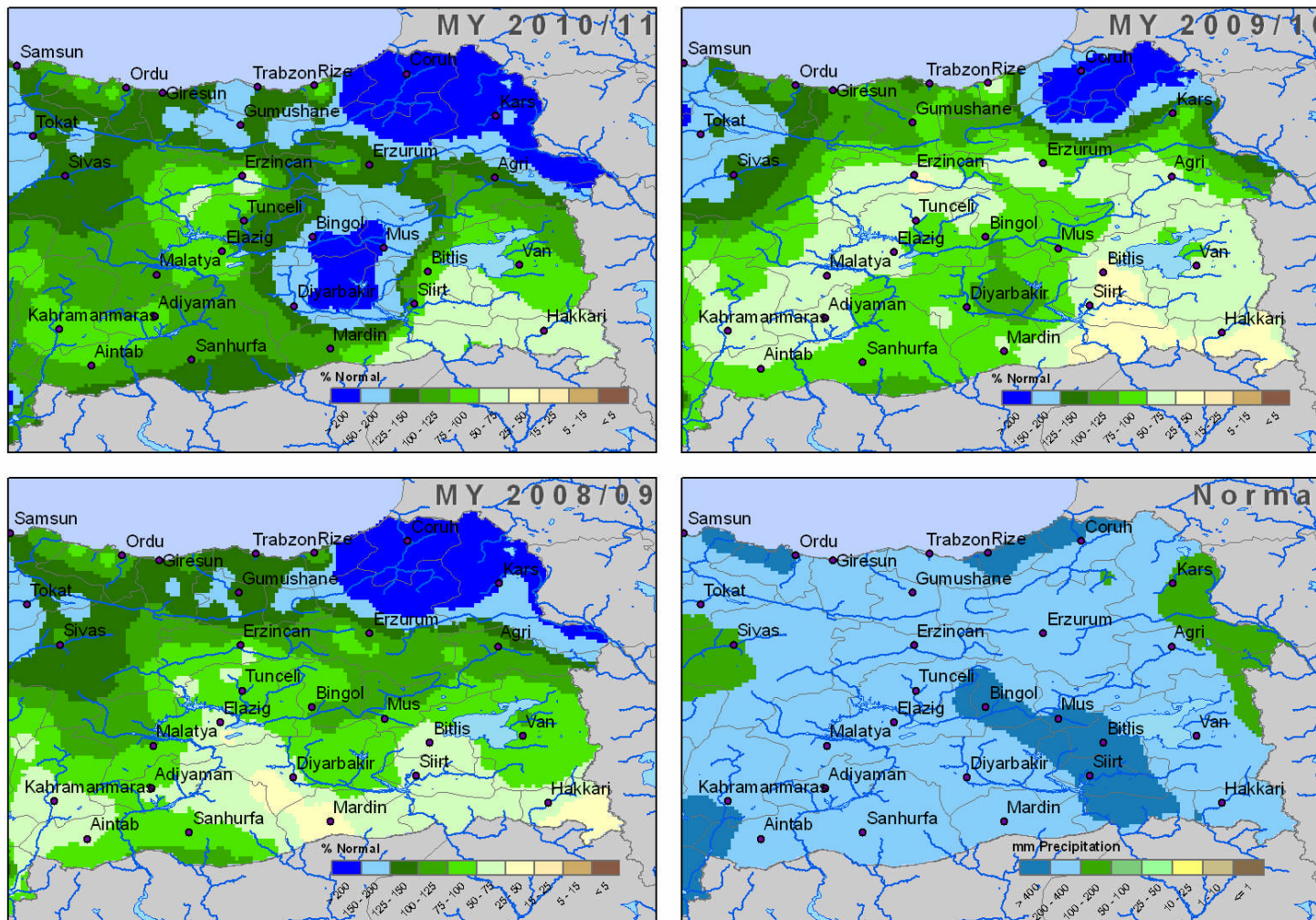
Data Source: AFWA Precipitation
USDA-FAS, Office of Global Analysis, IPAD
Crop Explorer



Figure 3. Monthly and season-to-date percent of normal precipitation for MY 2010/11.

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E. Turkey: Percent of Normal Cumulative Precipitation: September 1 - February 20



Data Source: AFWA Precipitation
USDA/FAS/OGA/IPAD



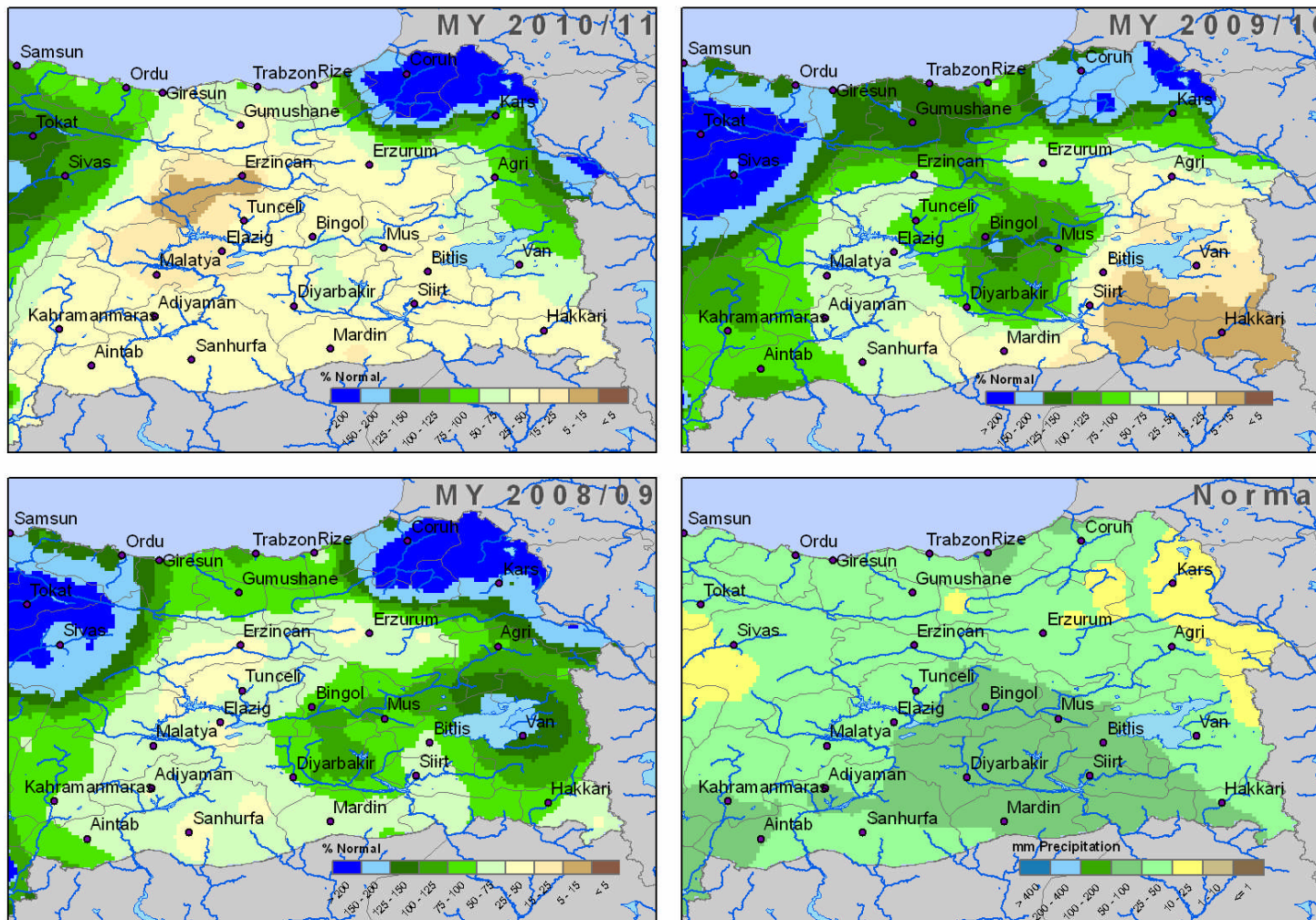
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Figure 4. Season-to-date percent normal precipitation and normals for eastern Turkey.

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E. Turkey: Percent of Normal Cumulative Precipitation: February 1 - 20



Data Source: AFWA Precipitation
USDA/FAS/OGA/IPAD

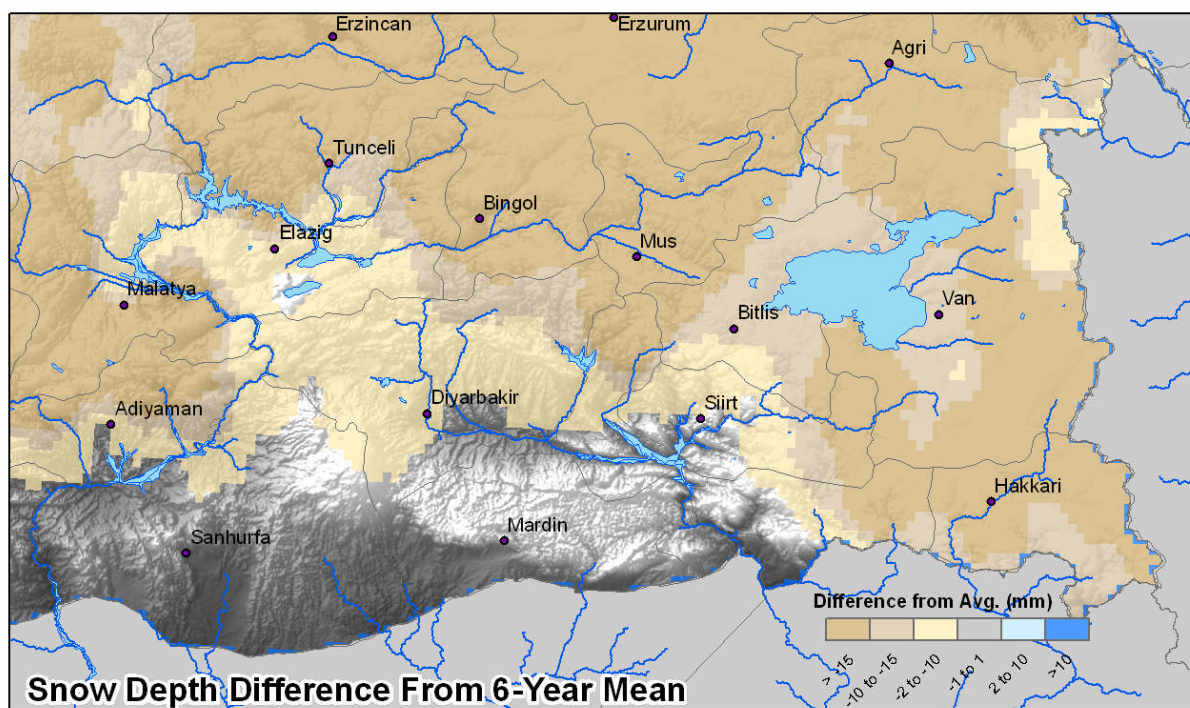
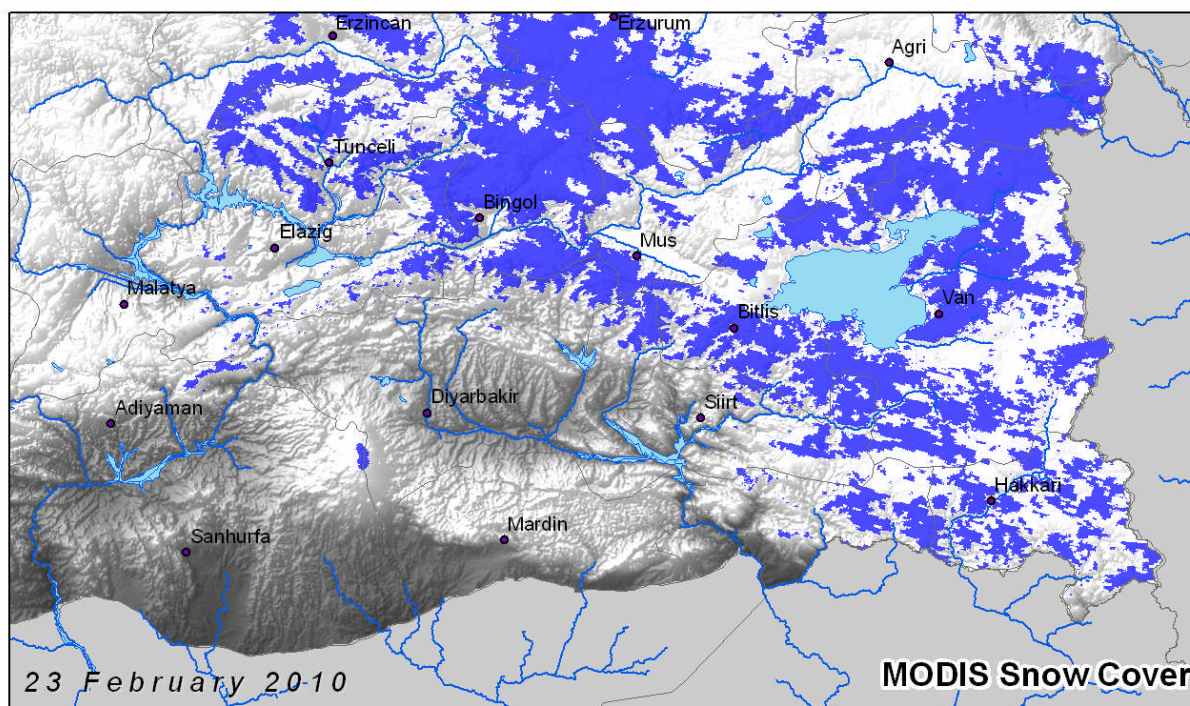


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Figure 5. Percent normal precipitation and normals for eastern Turkey for the first two decades of February.

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 SE Turkey: Snow Cover, February 23, 2010



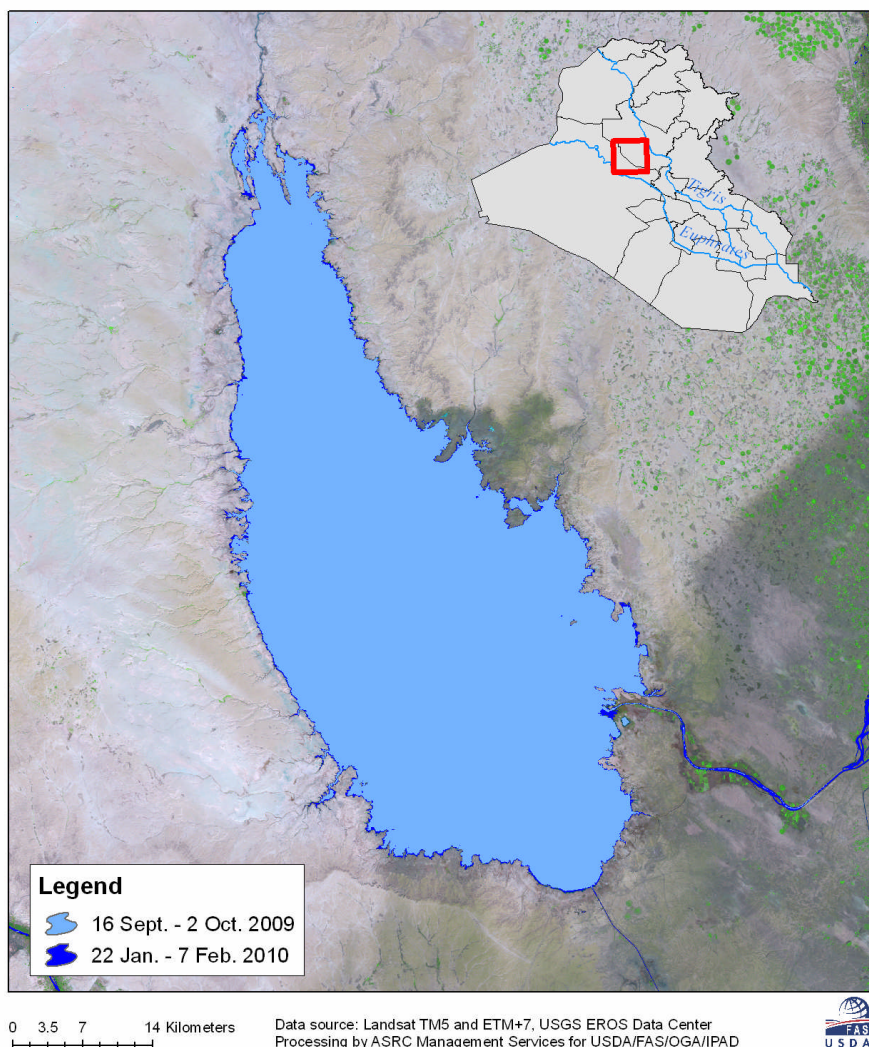
Data Source: MODIS Snow Cover, AFWA Snow Depth
 Data Provided by: NASA, National Snow and Ice Center
 Supporting: USDA/FAS/OGA/IPAD



Figure 6. MODIS Snow cover and AFWA snow depth difference from 6-year average for eastern Turkey.

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Buhayrat ath-Tharthar Lake Area
Salah ad-Din and al-Anbar Provinces, Iraq



Buhayrat ath-Tharthar Lake Level Variations

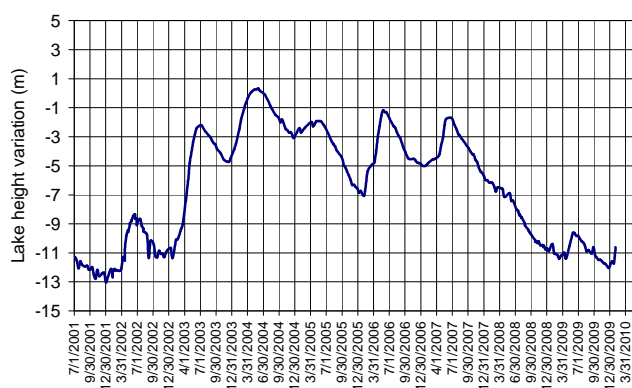


Figure 7. Lake level changes for Buhayrat ath-Tharthar.

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Temperature Departure from Normal: Jan. 21 - Feb. 20, 2010

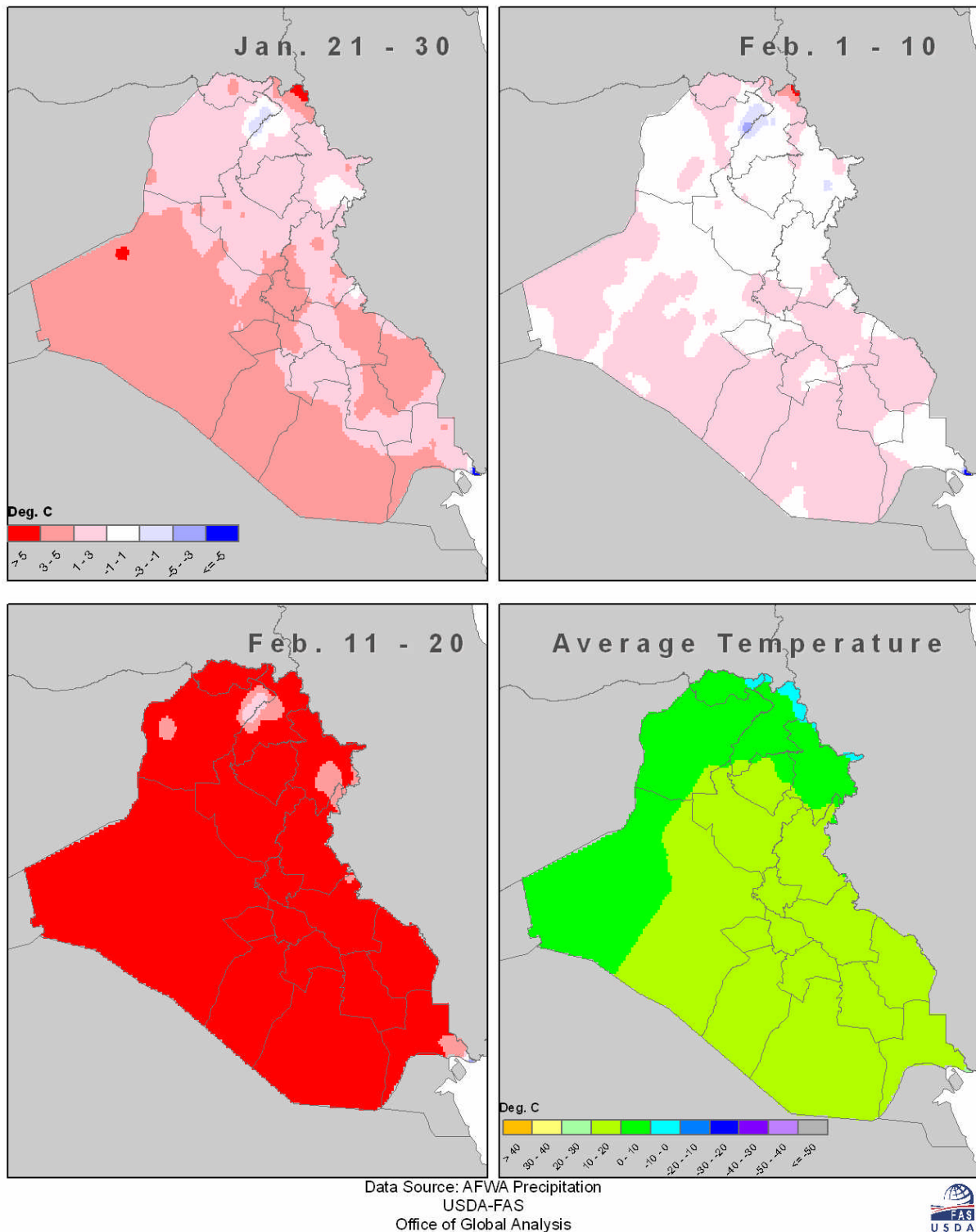


Figure 8. Temperature departure from normal in degrees Centigrade for the last decade of January and the first two decades of February 2010, and average temperature for that period.

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7-day Precipitation Forecast over Agricultural Lands: February 25 - March 3, 2010

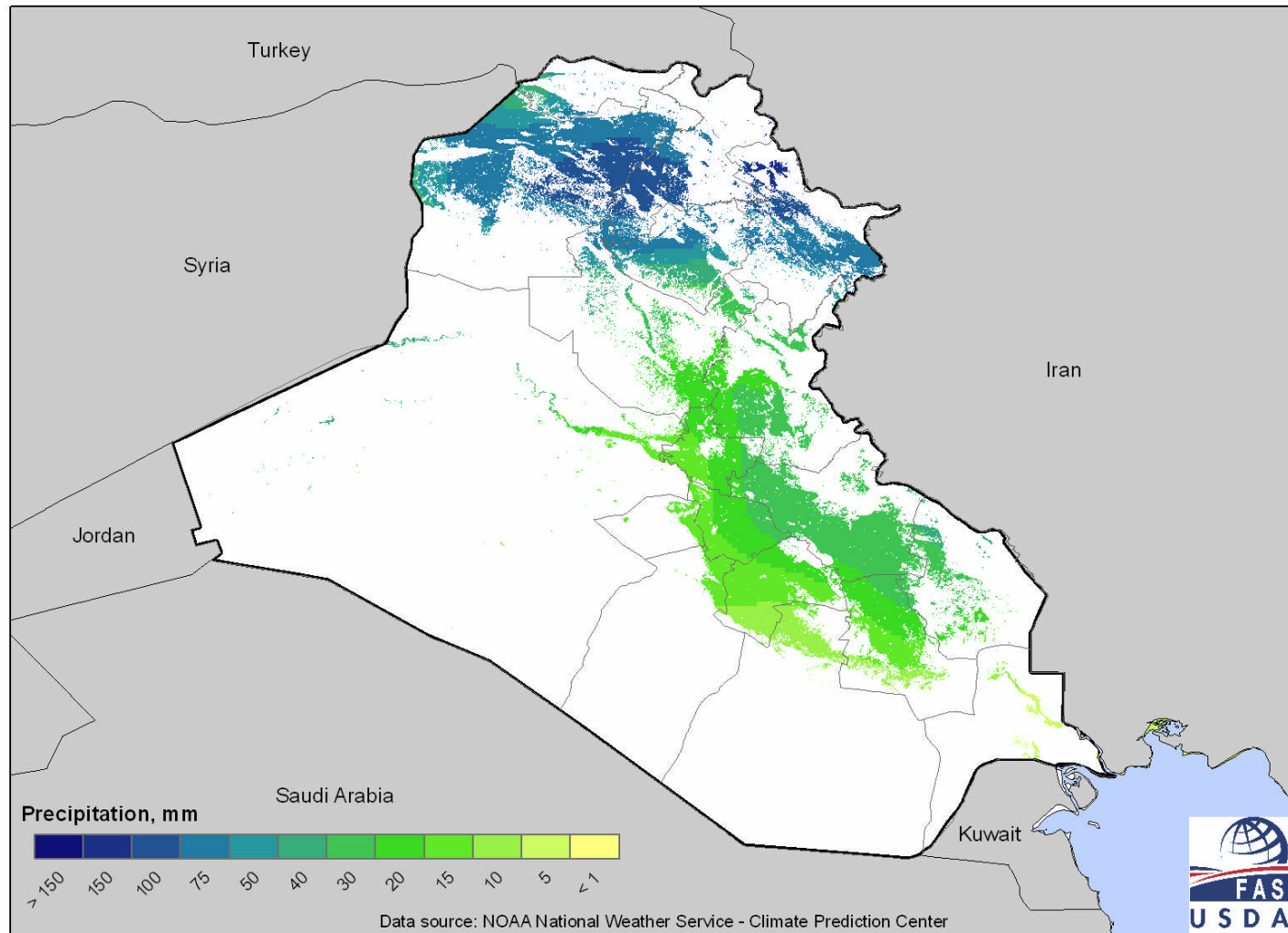
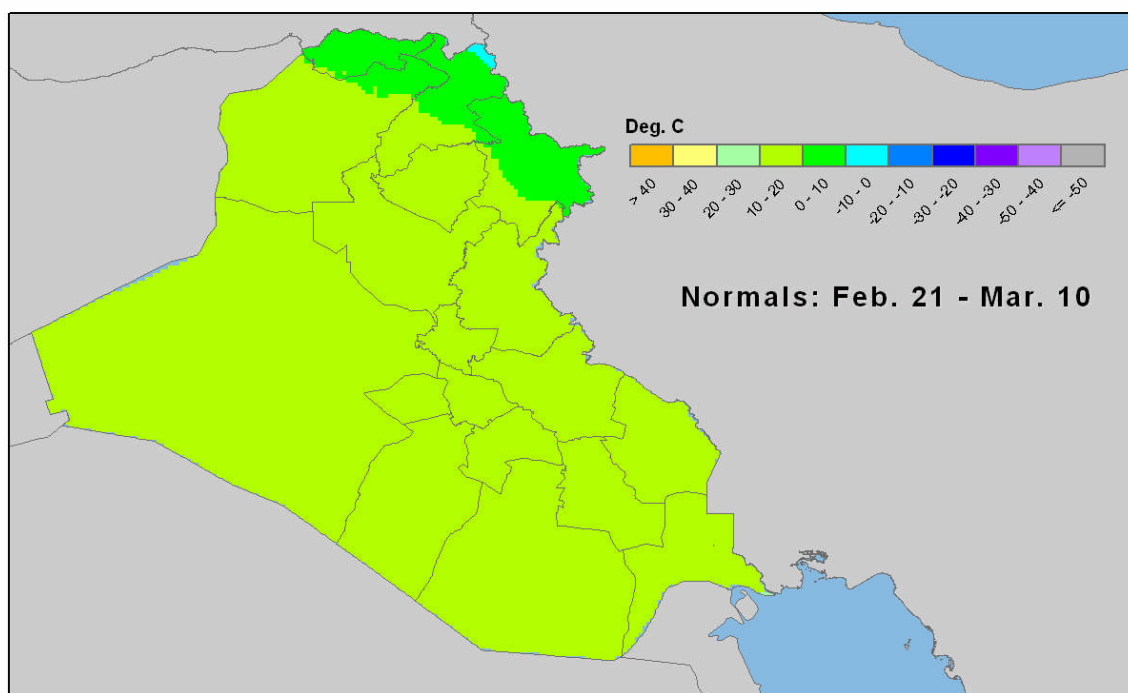
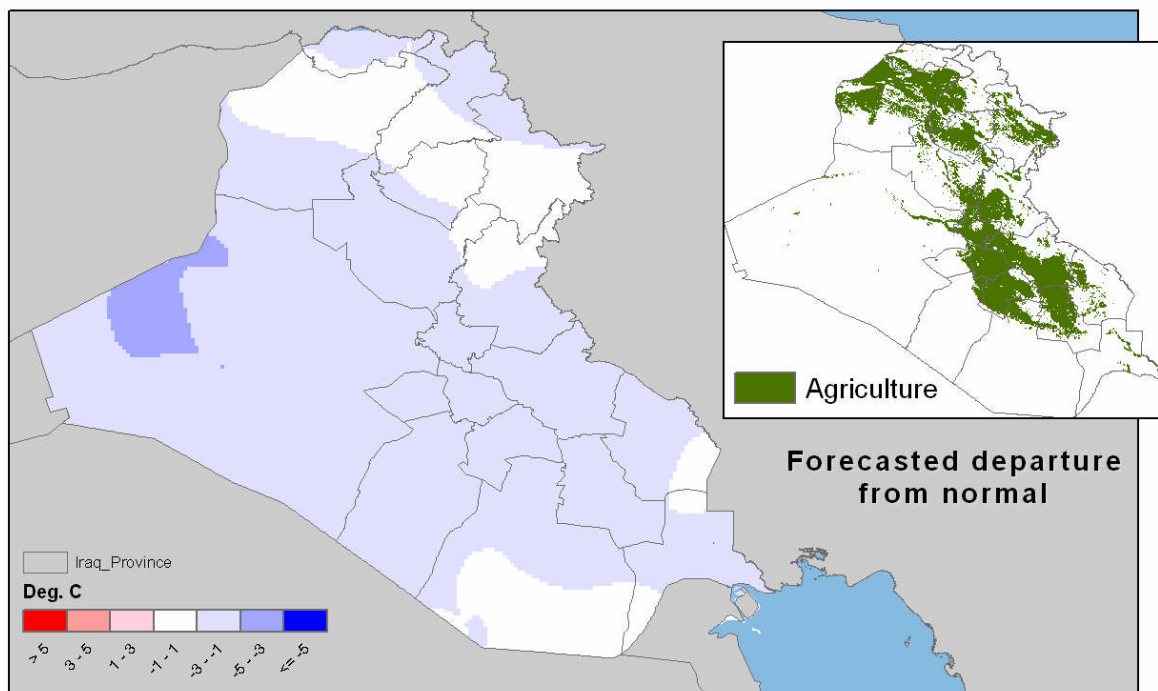


Figure 9. Seven-day precipitation forecast.

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Iraq Mean Temperature Forecast: Feb. 25 - Mar. 3, 2010



Data Source: AFWA Precipitation, NOAA/NWS/ Climate Prediction Center
USDA-FAS, Office of Global Analysis, IPAD
Crop Explorer



Figure 10. Seven day mean temperature forecast and normal temperatures.

Figure 1 displays 12 maps of Maryland showing Normalized Difference Vegetation Index (NDVI) data from November 2006 to February 2010. The maps are arranged in a 3x4 grid. The legend indicates NDVI values from 0 to 1, with 'Sparse' for 0 to 0.5 and 'Dense' for 0.5 to 1. The maps show seasonal changes in vegetation density, with a color scale from 0 to 1. The data source is MODIS NDVI, University of Maryland, USDA/ERS/IGRA/PAF.

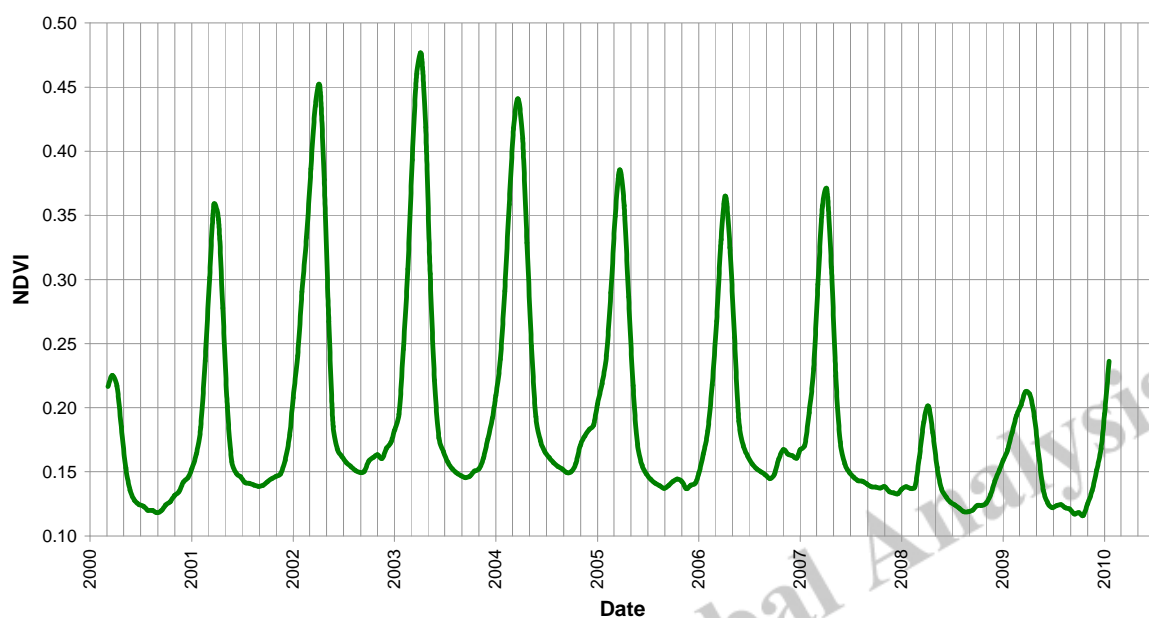
Month	Year
November	2006
December	2006
January	2007
February	2007
March	2007
April	2007
May	2007
June	2007
December	2009
January	2010
February	2010

Data Source: MODIS NDVI
University of Maryland
USDA/ERS/IGRA/PAF

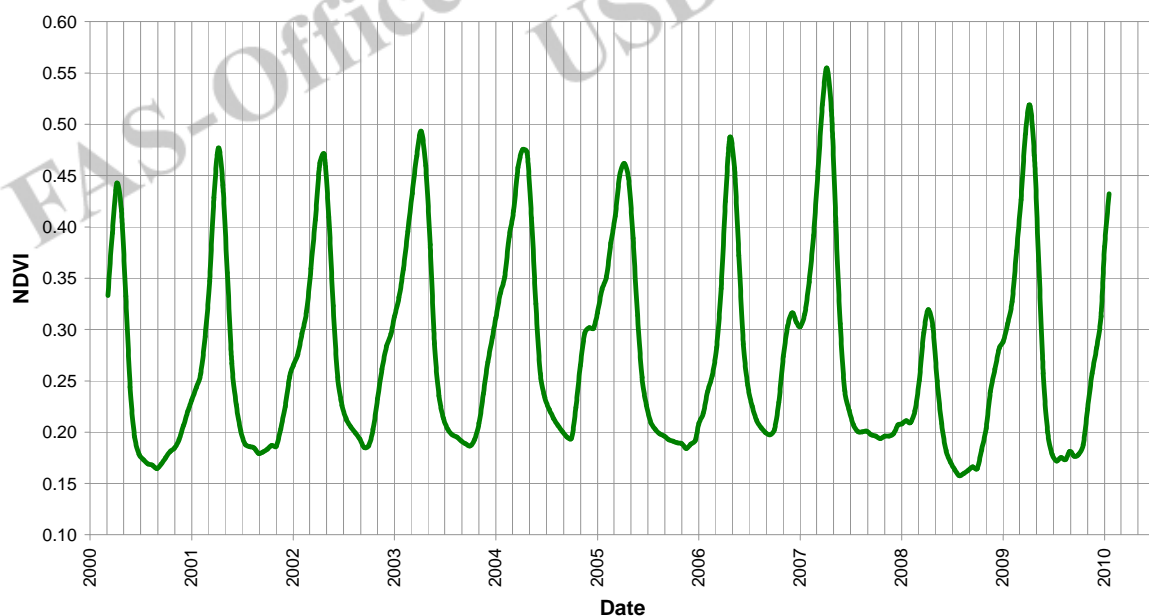
Figure 11. Vegetation growth through the winter grains growing season.

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Arbil, Iraq Rainfed Agriculture NDVI Time Series



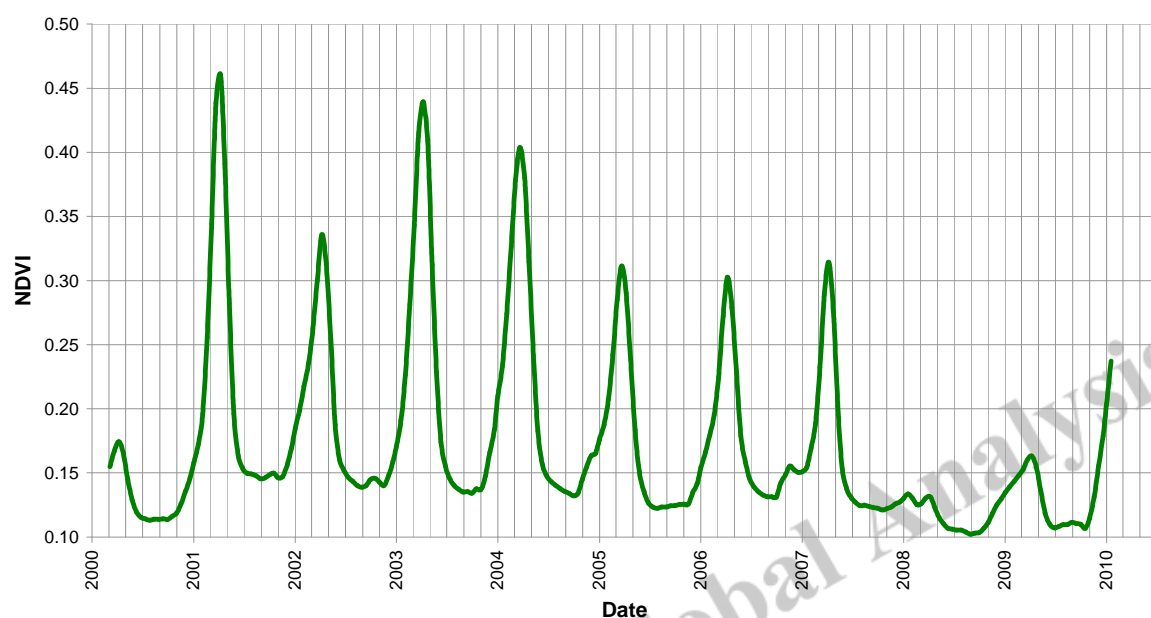
As-Sulaymaniyah, Iraq Rainfed Agriculture NDVI Time Series



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Figure 12a. MODIS NDVI time-series: important northern rainfed agricultural provinces.

Ninawa, Iraq Rainfed Agriculture NDVI Time Series



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At-Tamin, Iraq Rainfed Agriculture NDVI Time Series

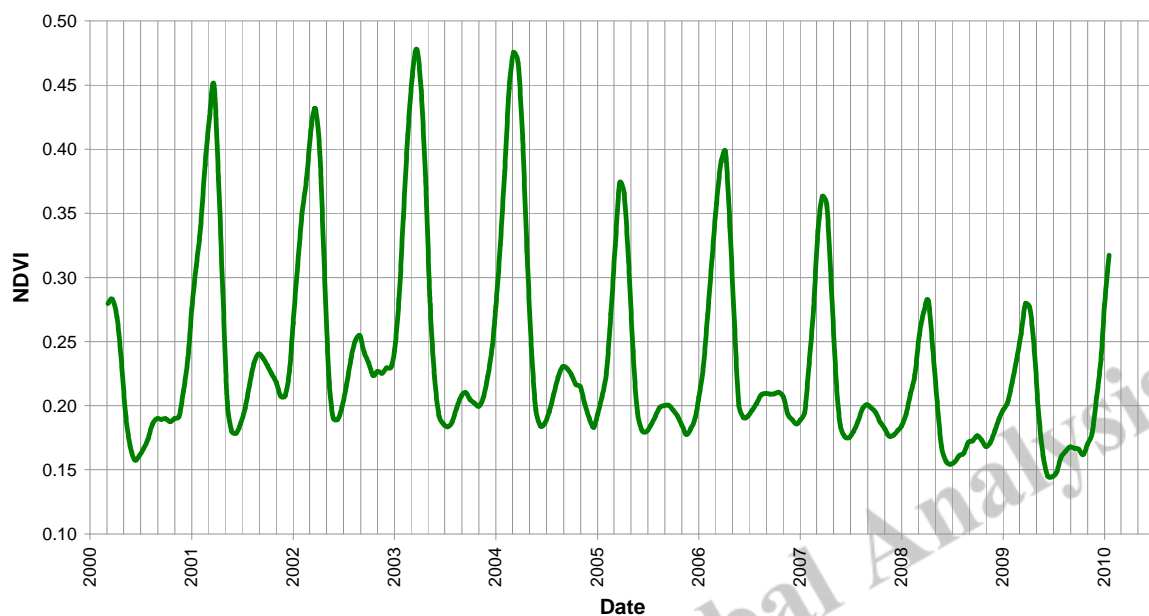
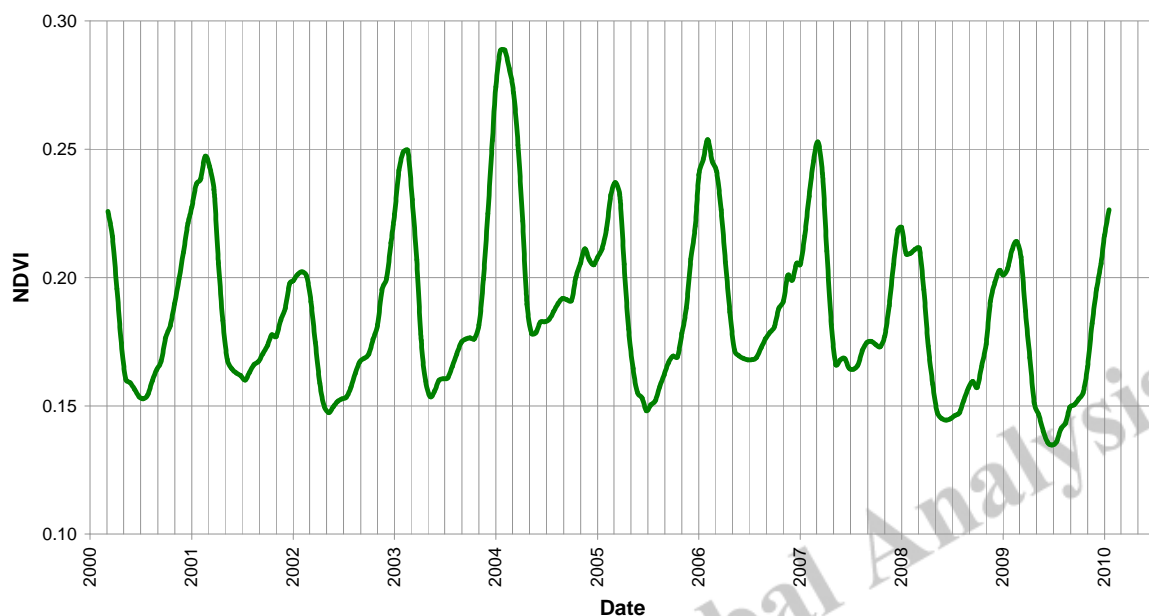


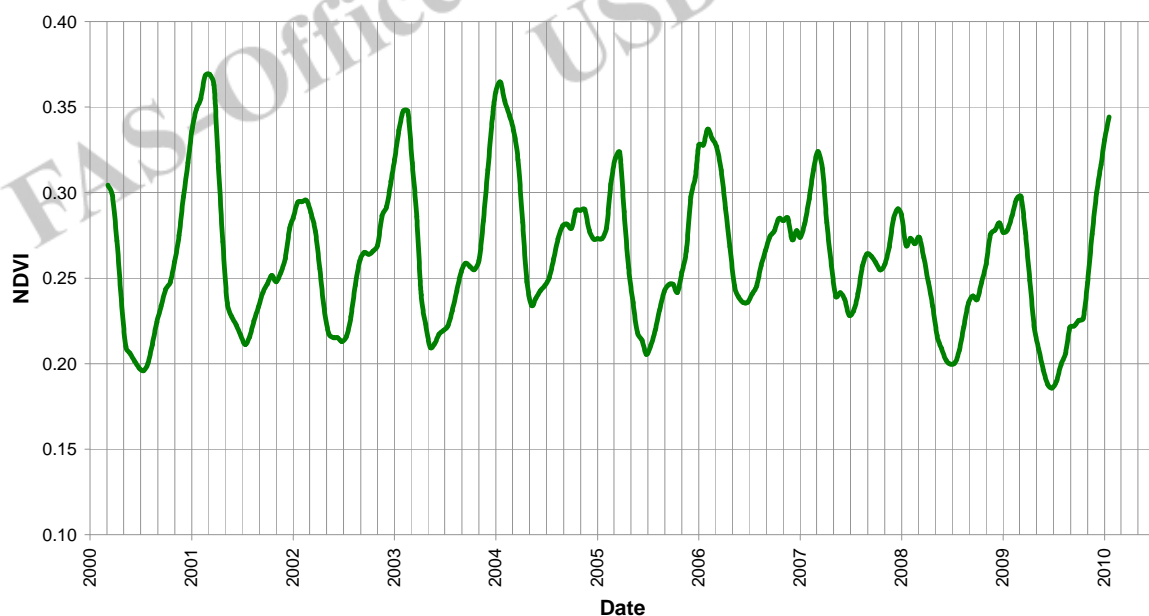
Figure 12b. MODIS NDVI time-series: important northern rainfed agricultural provinces.

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Al-Qadisiyah, Iraq Irrigated Agriculture NDVI Time Series



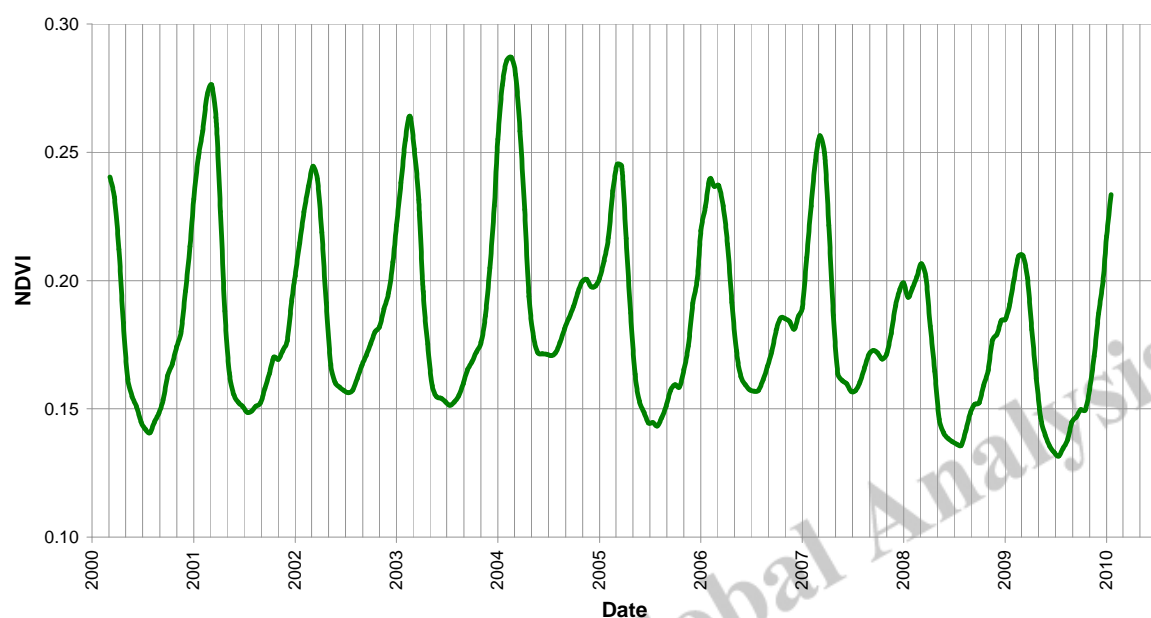
Babil, Iraq Irrigated Agriculture NDVI Time Series



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Figure 13a: MODIS NDVI time-series: important southern irrigated agricultural provinces.

Wasit, Iraq Irrigated Agriculture NDVI Time Series



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Diyala, Iraq Irrigated Agriculture NDVI Time Series

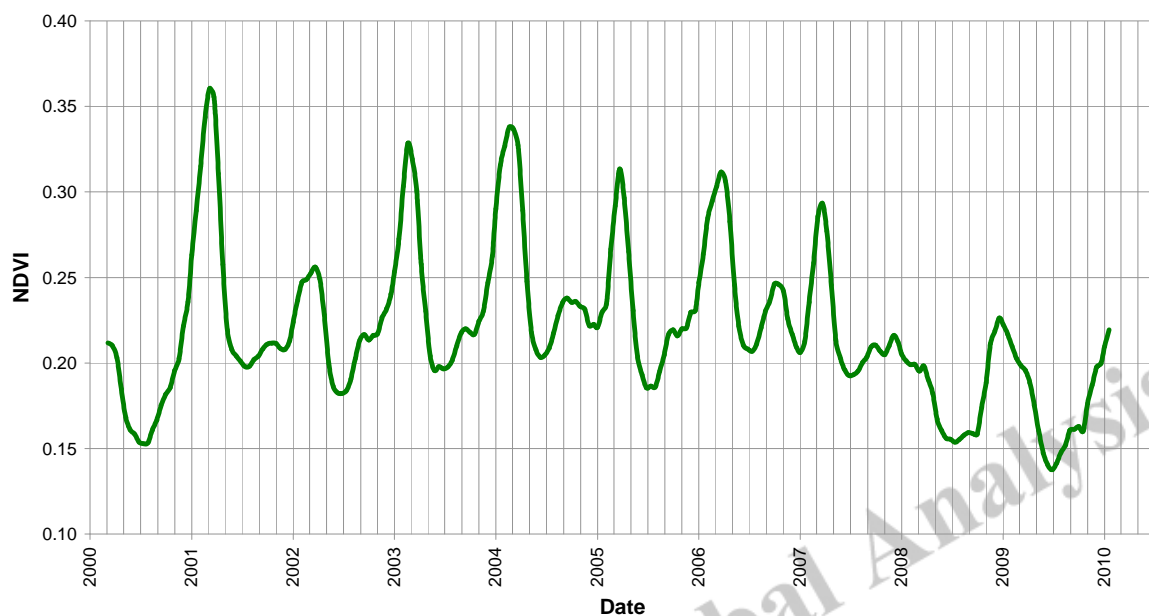
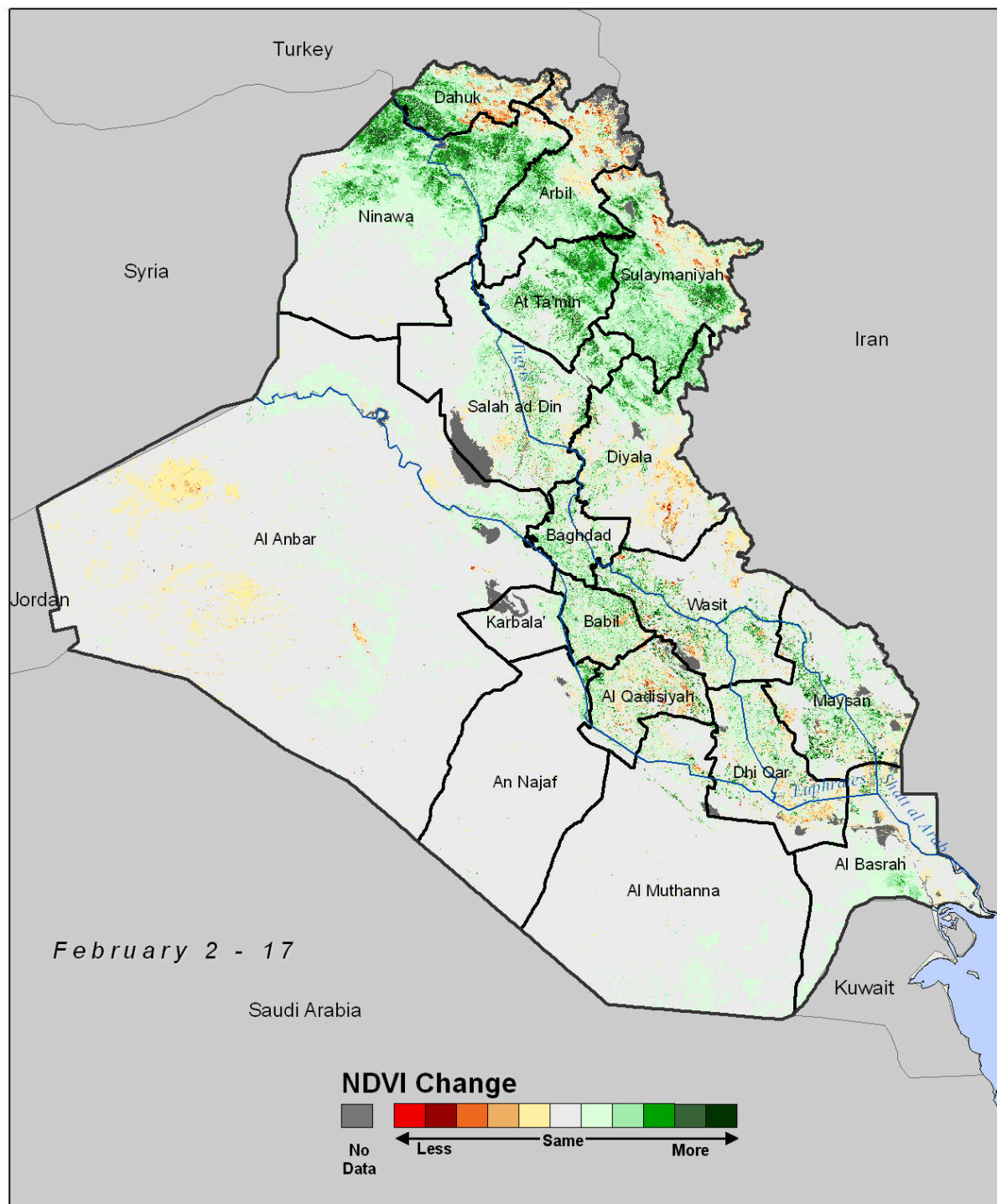


Figure 13b: MODIS NDVI time-series: important southern irrigated agricultural provinces.

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MODIS NDVI Change: MY 2010/11 vs. MY 2009/10



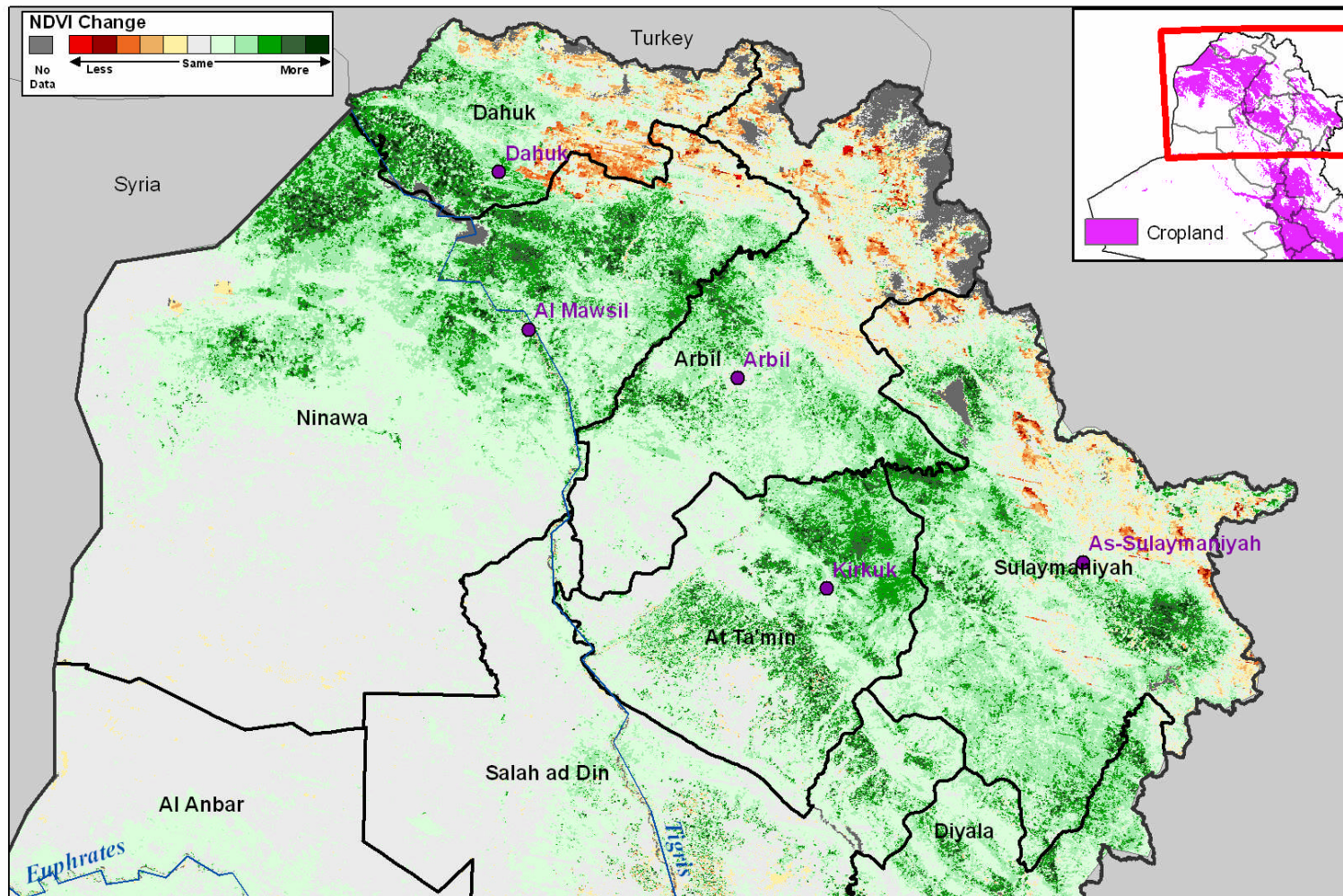
Data Source: MODIS 16-Day NDVI
Data Provided by: University of Maryland
Supporting: USDA/FAS/OGA/IPAD



Figure 14. Change in MODIS NDVI: MY 2010/11 vs. MY 2009/10 drought year.

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MODIS NDVI Change in Northern Iraq: MY 2010/11 vs. MY 2009/10



February 2 - 17

Data Source: MODIS 16-Day NDVI
Data Provided by: University of Maryland
Supporting: USDA/FAS/OGA/IPAD



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Figure 15. Change in MODIS NDVI for northern Iraq: MY 2010/11 vs. MY 2009/10 drought year. Red box in inset map denotes main scene extent.

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MODIS NDVI Change: MY 2010/11 vs. 6 Year Mean

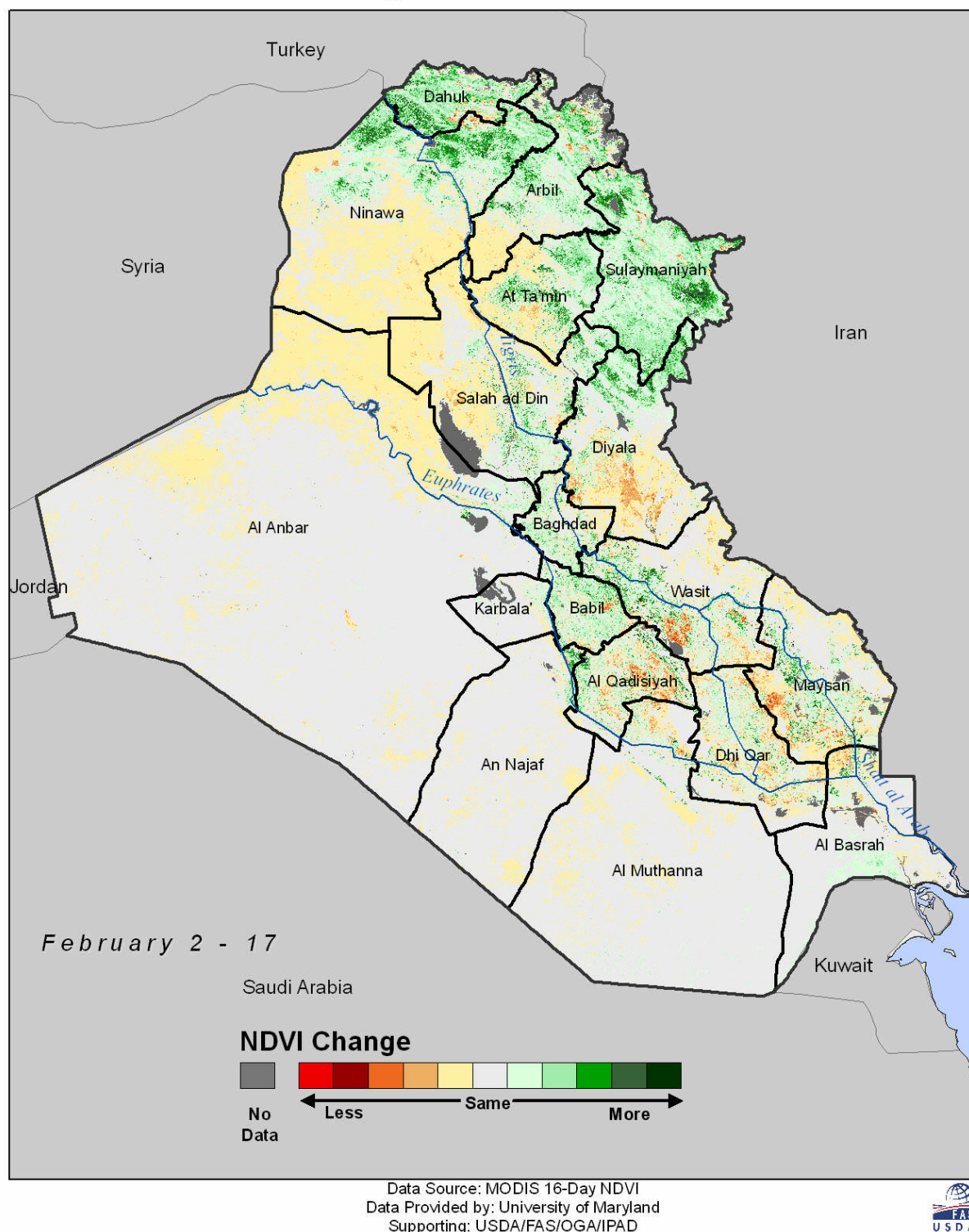
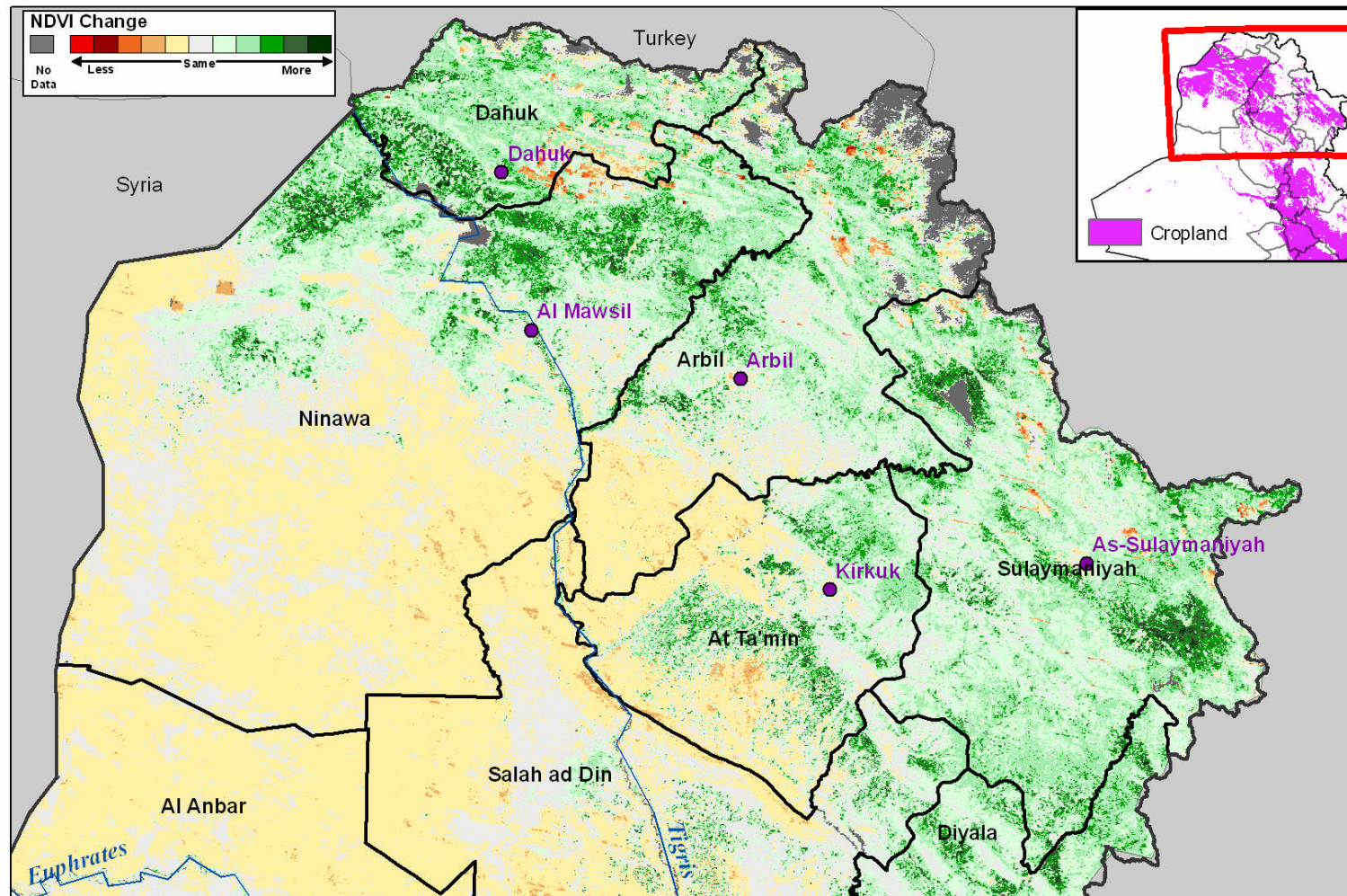


Figure 16. Change in MODIS NDVI: MY 2010/11 vs. 6-year average.

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MODIS NDVI Change in Northern Iraq: MY 2010/11 vs. 6 Year Mean



February 2 - 17

Data Source: MODIS 16-Day NDVI
Data Provided by: University of Maryland
Supporting: USDA/FAS/OGA/IPAD



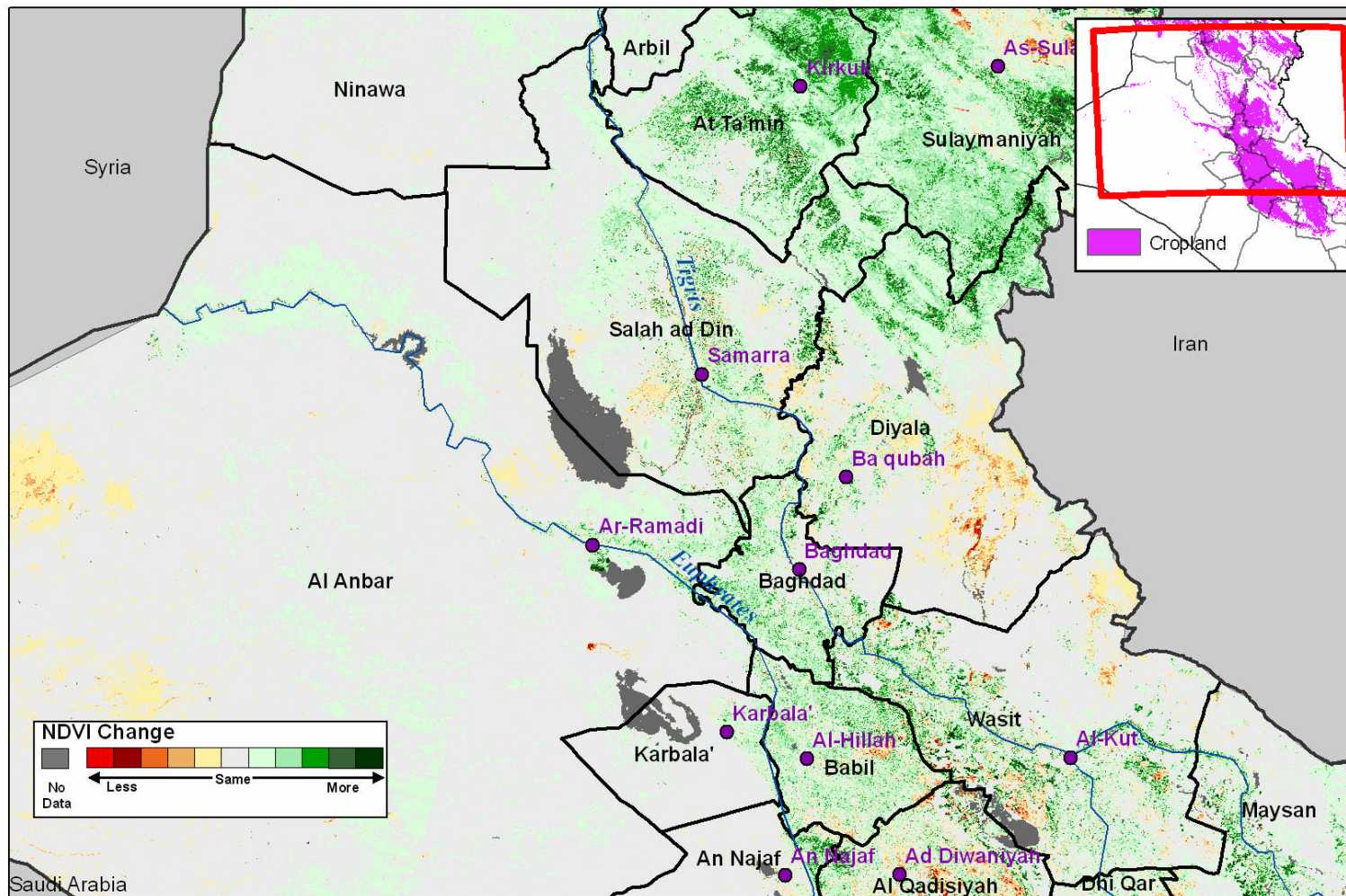
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Figure 17. Change in MODIS NDVI for northern Iraq: MY 2010/11 vs. vs. 6-year average. Red box in inset map denotes main scene extent.

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MODIS NDVI Change in Central Iraq: MY 2010/11 vs. MY 2009/10



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Data Source: MODIS 16-Day NDVI
Data Provided by: University of Maryland
Supporting: USDA/FAS/OGA/IPAD



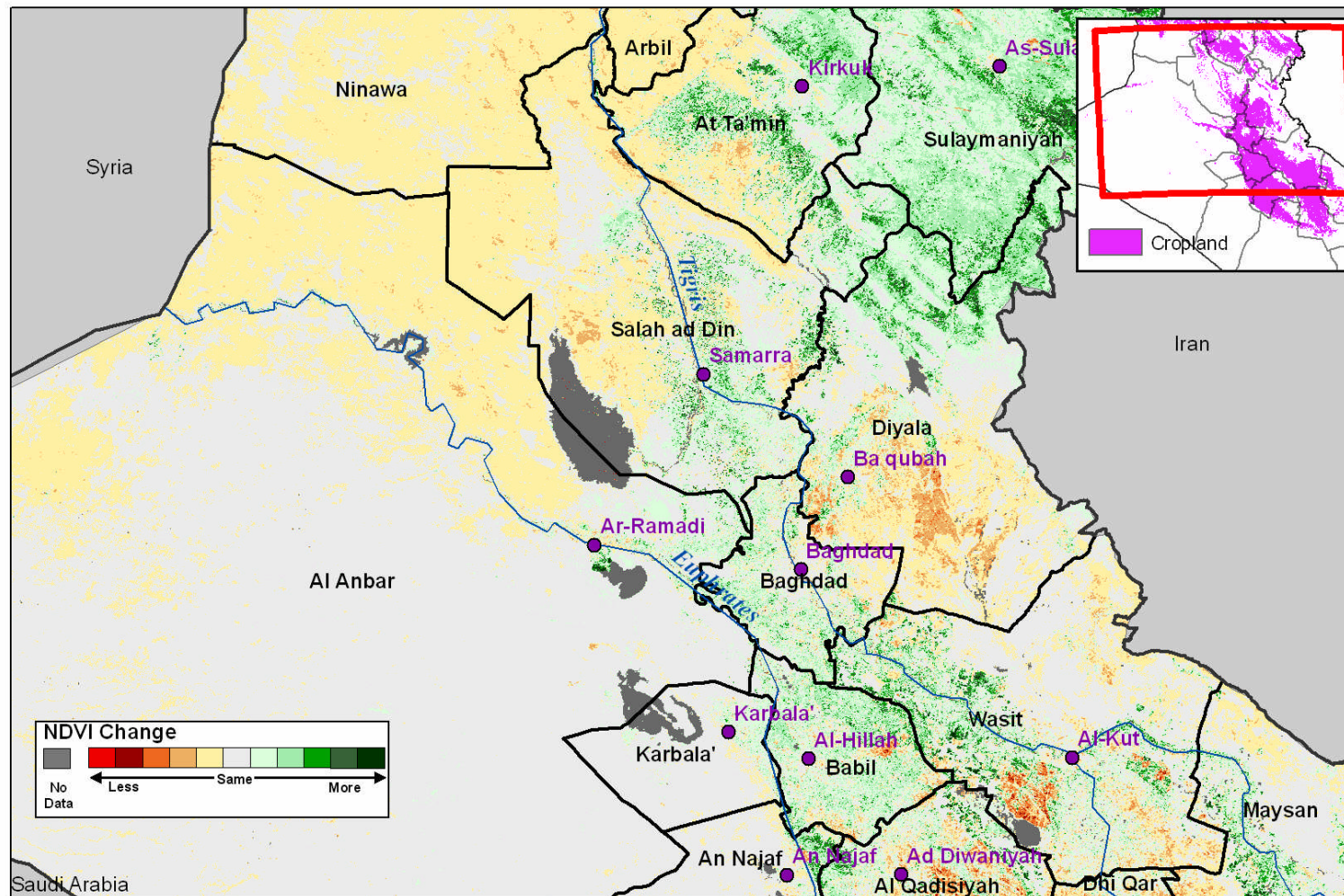
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Figure 18. Change in MODIS NDVI for central Iraq: MY 2010/11 vs. MY 2009/10 drought year. Red box in inset map denotes main scene extent.

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MODIS NDVI Change in Central Iraq: MY 2010/11 vs. 6 Year Mean



February 2 - 17

Data Source: MODIS 16-Day NDVI
Data Provided by: University of Maryland
Supporting: USDA/FAS/OGA/IPAD



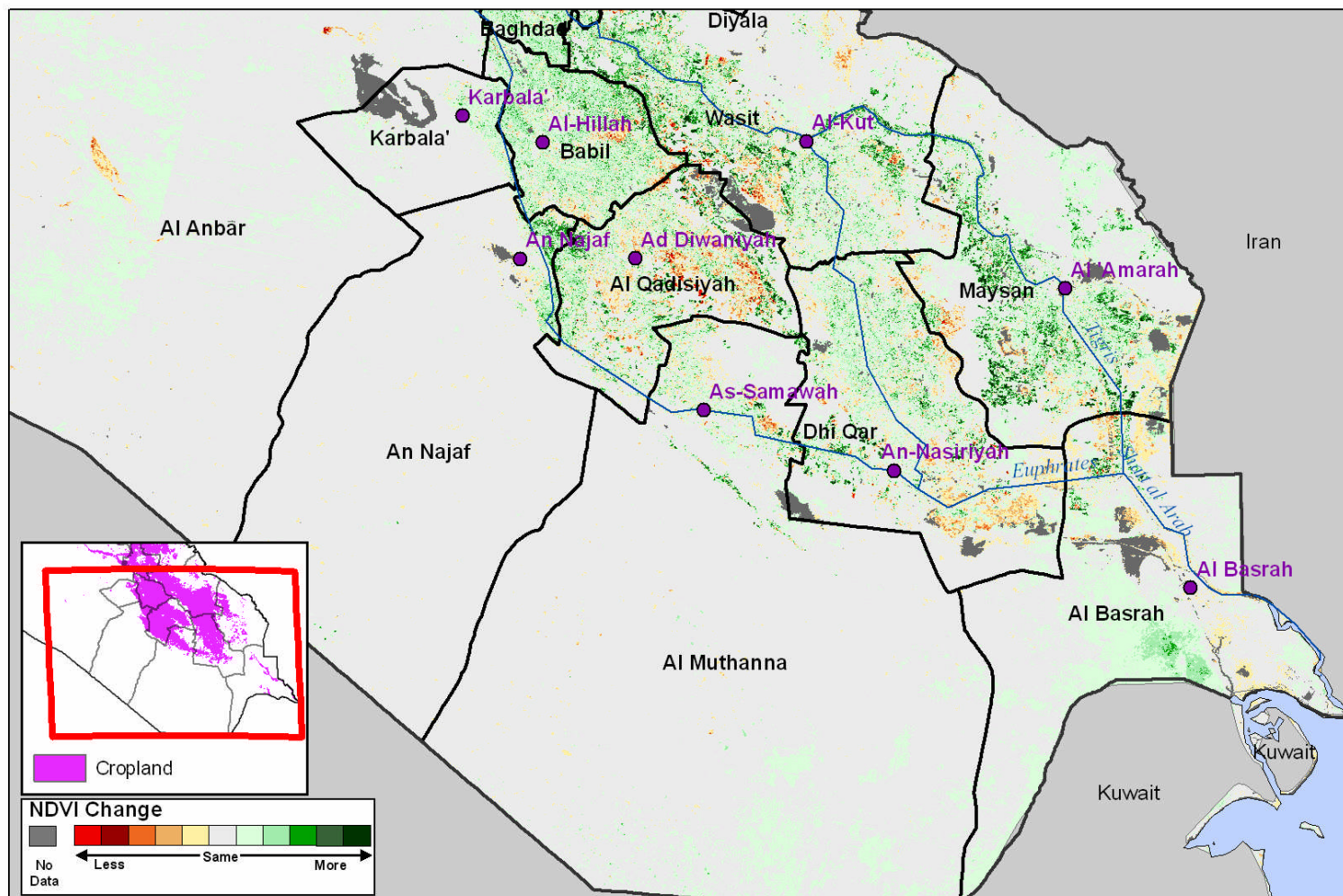
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Figure 19. Change in MODIS NDVI for central Iraq: MY 2010/11 vs. vs. 6-year average. Red box in inset map denotes main scene extent.

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MODIS NDVI Change in Southern Iraq: MY 2010/11 vs. MY 2009/10



February 2 - 17

Data Source: MODIS 16-Day NDVI
Data Provided by: University of Maryland
Supporting: USDA/FAS/OGA/IPAD



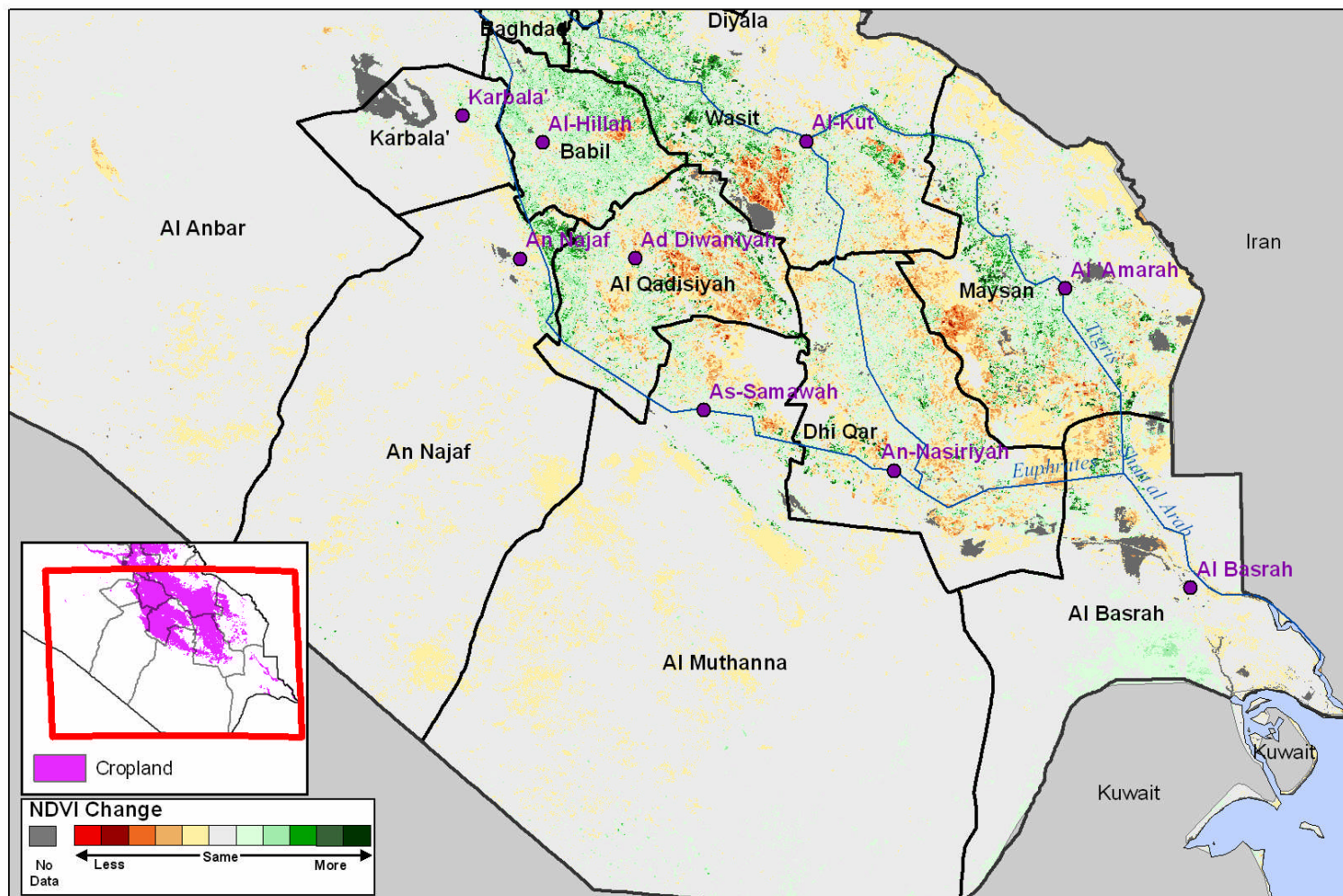
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Figure 20. Change in MODIS NDVI for southern Iraq: MY 2010/11 vs. MY 2009/10 drought year. Red box in inset map denotes main scene extent.

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MODIS NDVI Change in Southern Iraq: MY 2010/11 vs. 6 Year Mean



February 2 - 17

Data Source: MODIS 16-Day NDVI
Data Provided by: University of Maryland
Supporting: USDA/FAS/OGA/IPAD

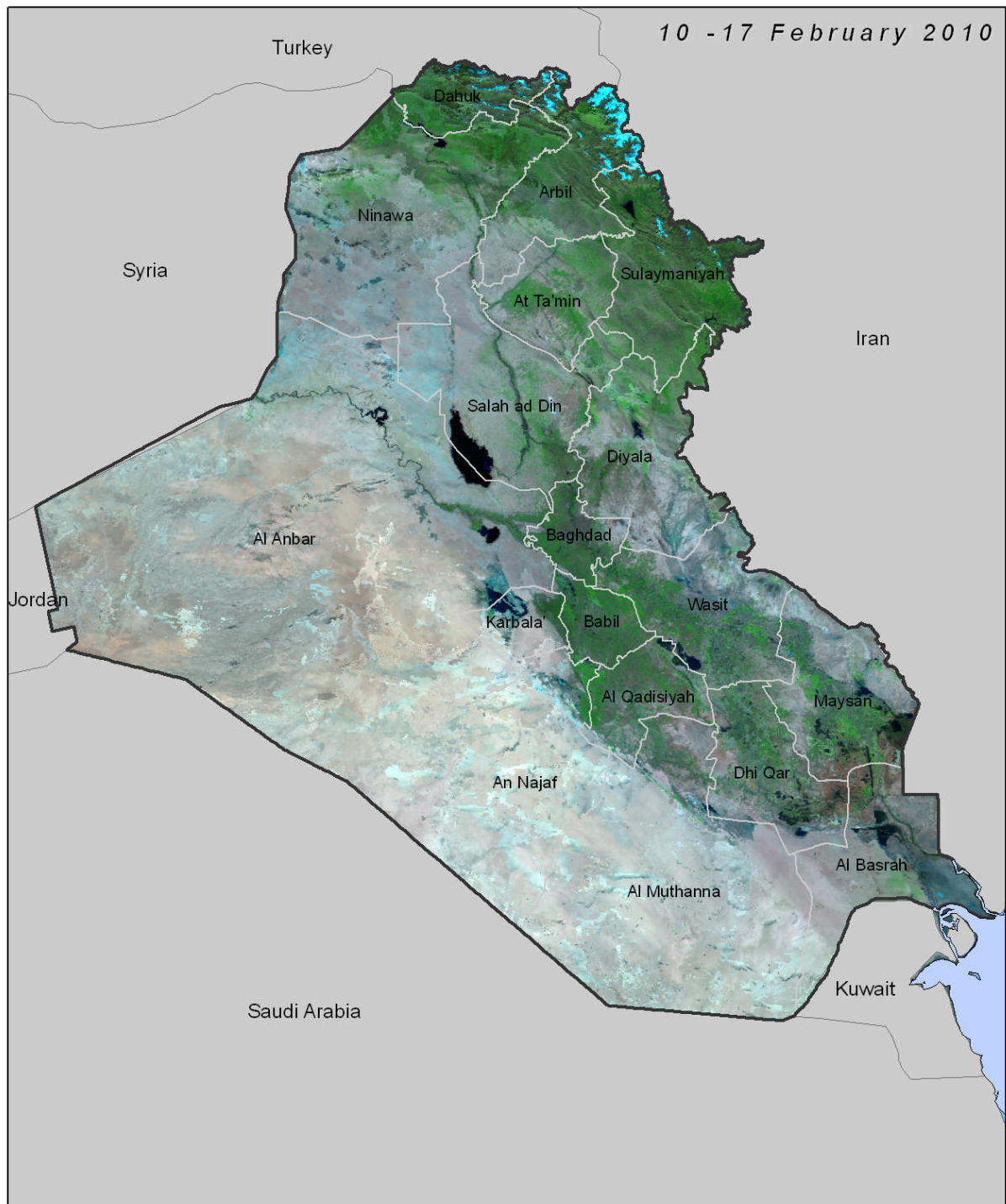


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Figure 21. Change in MODIS NDVI for southern Iraq: MY 2010/11 vs. vs. 6-year average. Red box in inset map denotes main scene extent.

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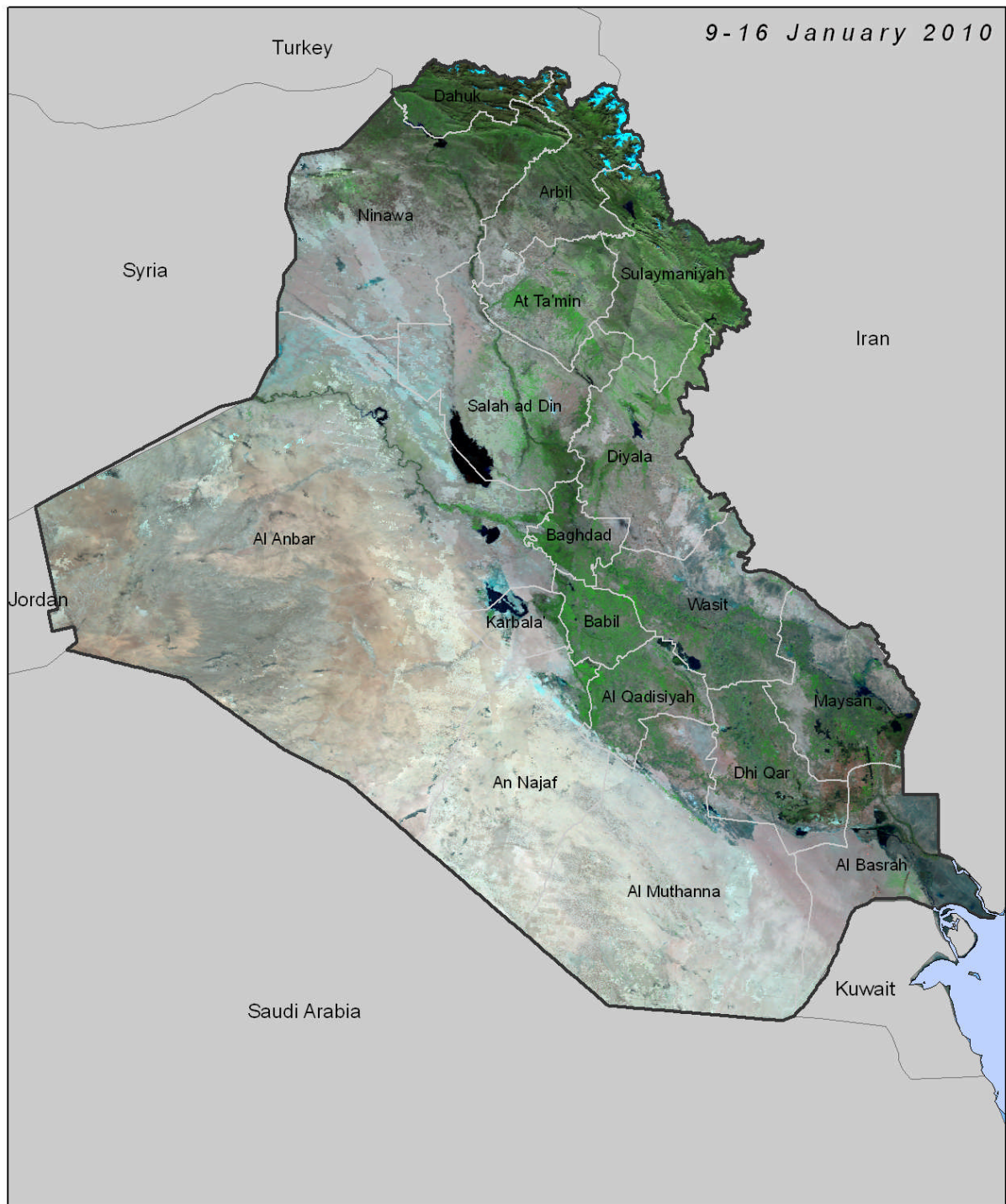
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MODIS 721 False-Color Image



Data Source: MODIS 8-Day 721 Composite
Data Provided by USGS EROS Data Center/ NASA Goddard
Supporting: USDA/FAS/OGA/IPAD

Figure 22. Current month false-color MODIS bands 7, 2, 1 image.

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MODIS 721 False-Color Image



Data Source: MODIS 8-Day 721 Composite
Data Provided by USGS EROS Data Center/ NASA Goddard
Supporting: USDA/FAS/OGA/IPAD

Figure 23. Previous month false-color MODIS bands 7, 2, 1 image.

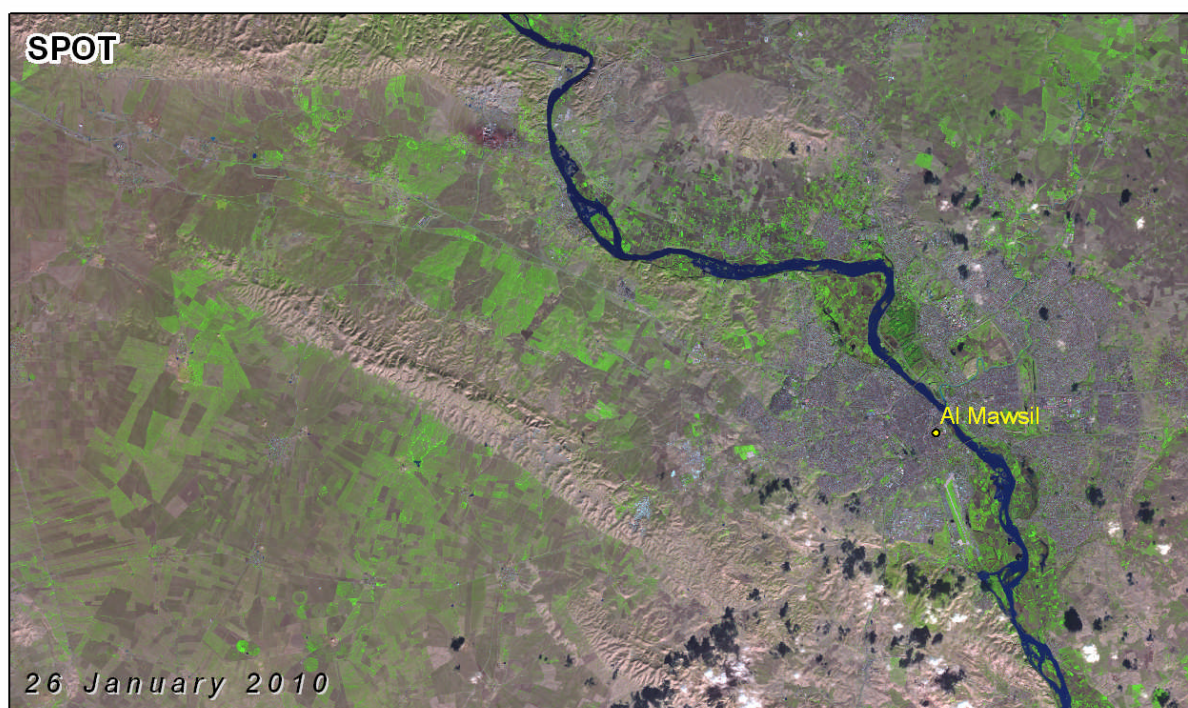
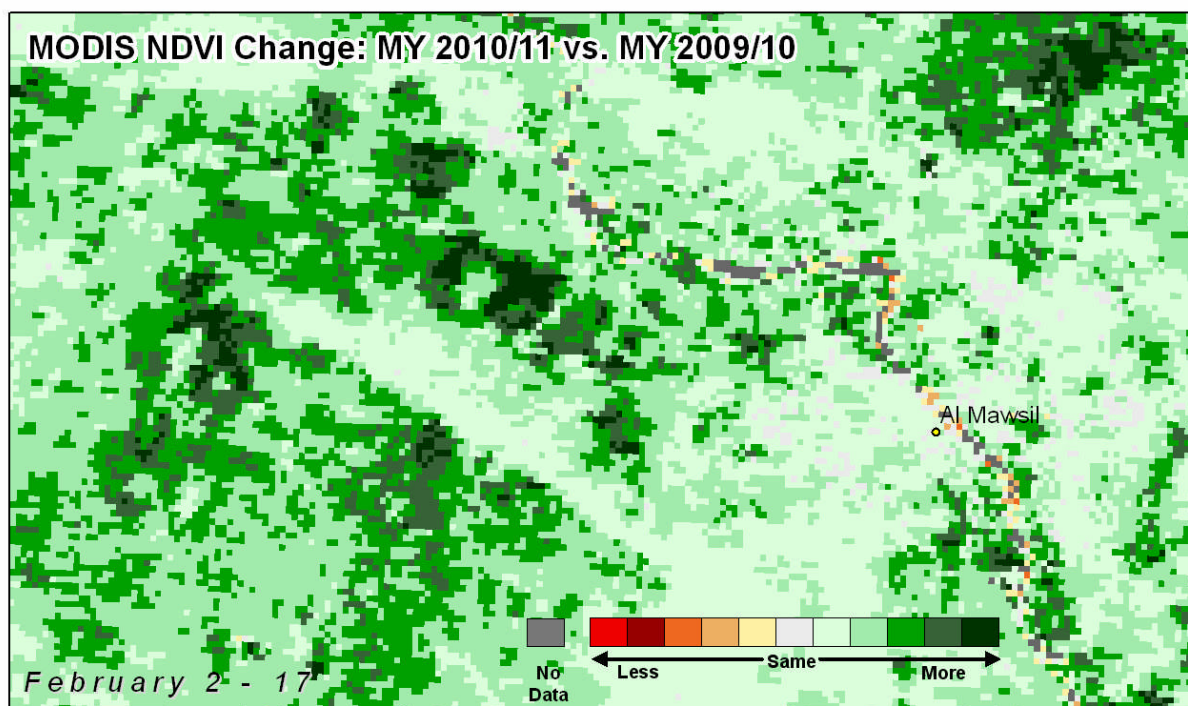
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MODIS 721 False-Color Image



Data Source: MODIS 8-Day 721 Composite
Data Provided by USGS EROS Data Center/ NASA Goddard
Supporting: USDA/FAS/OGA/IPAD

Figure 24. Previous year false-color MODIS bands 7, 2, 1 image.

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 Ninawa: 1-year MODIS NDVI Change and SPOT Imagery



Data Source: MODIS 16-Day NDVI and SPOT
 Data Provided by: University of Maryland and SPOT IMAGE
 Supporting: USDA/FAS/OGA/IPAD



Figure 25. Change in MODIS NDVI for MY 2010/11 vs. MY 2009/10 drought year and current year SPOT image for Ninawa Province.

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Irrigated Agriculture near Qaryat Harichah, Al-Qadisiyah Province, Iraq



Data Sources: Quickbird and SPOT
Processing by ASRC Management Services for USDA/FAS/OGA/IPAD

0 750 1,500 3,000 Meters



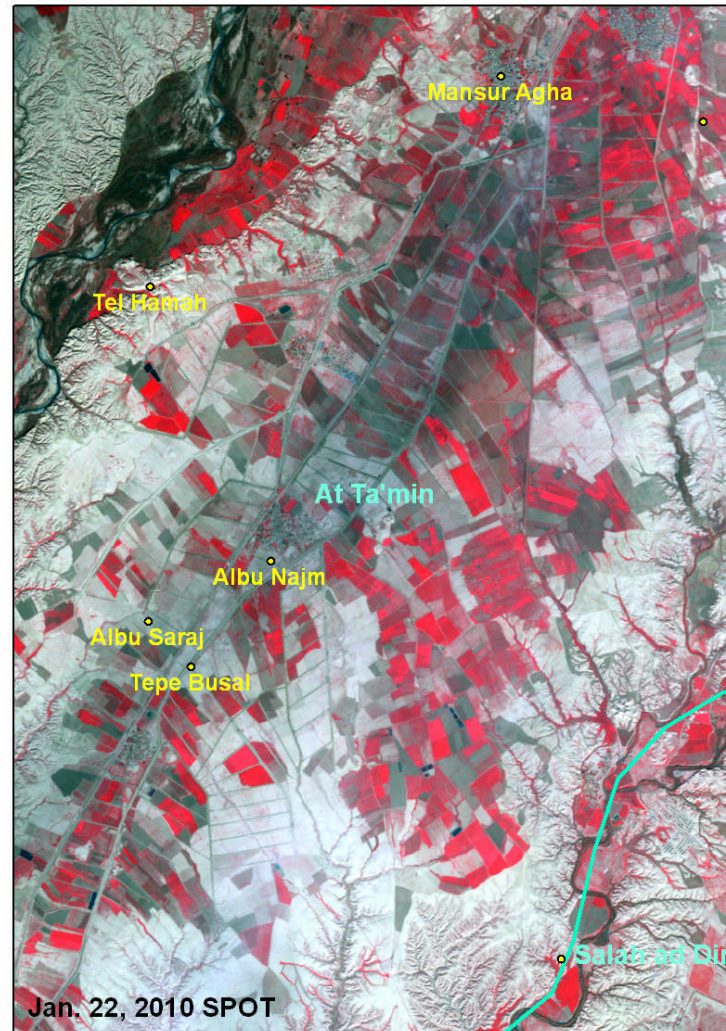
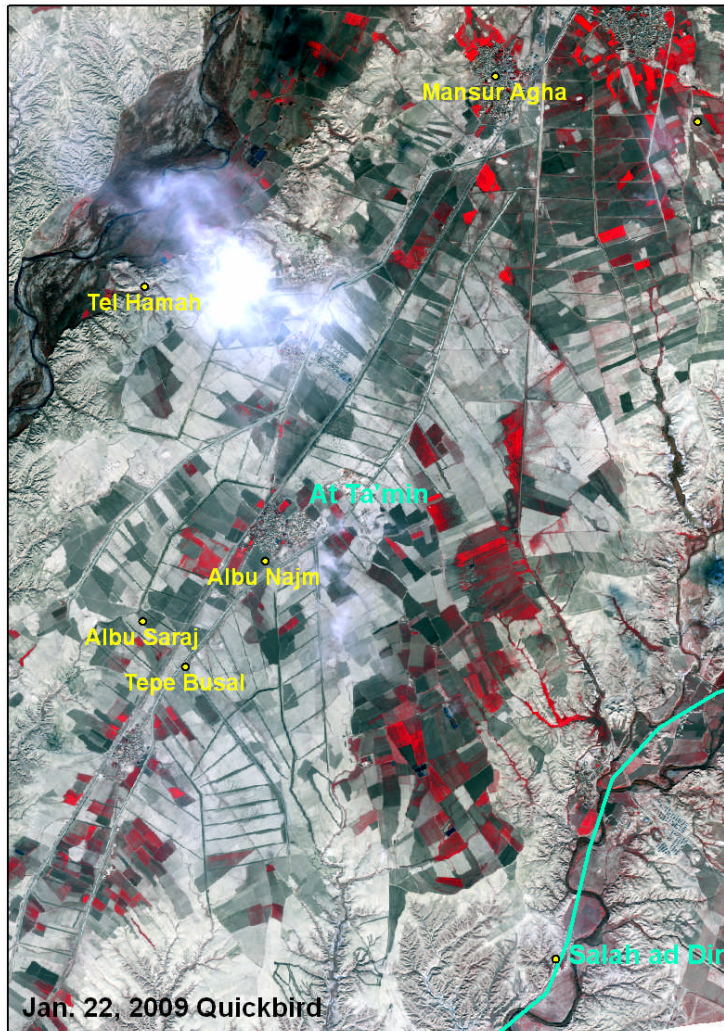
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Figure 26. Quickbird and SPOT images of irrigated crops near Qaryat Harichah in Al-Qadisiyah Province, Iraq.

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Irrigated Agriculture near Mansur Agha, At-Tamin Province, Iraq



Data Sources: Quickbird and SPOT
Processing by ASRC Management Services for USDA/FAS/OGA/IPAD

0 1,250 2,500 5,000 Meters



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Figure 27. Quickbird and SPOT images of rainfed crops near Mansur Agha in the at-Tamin Province and bordering the Salah ad-Din Province, Iraq.

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 APPENDIX

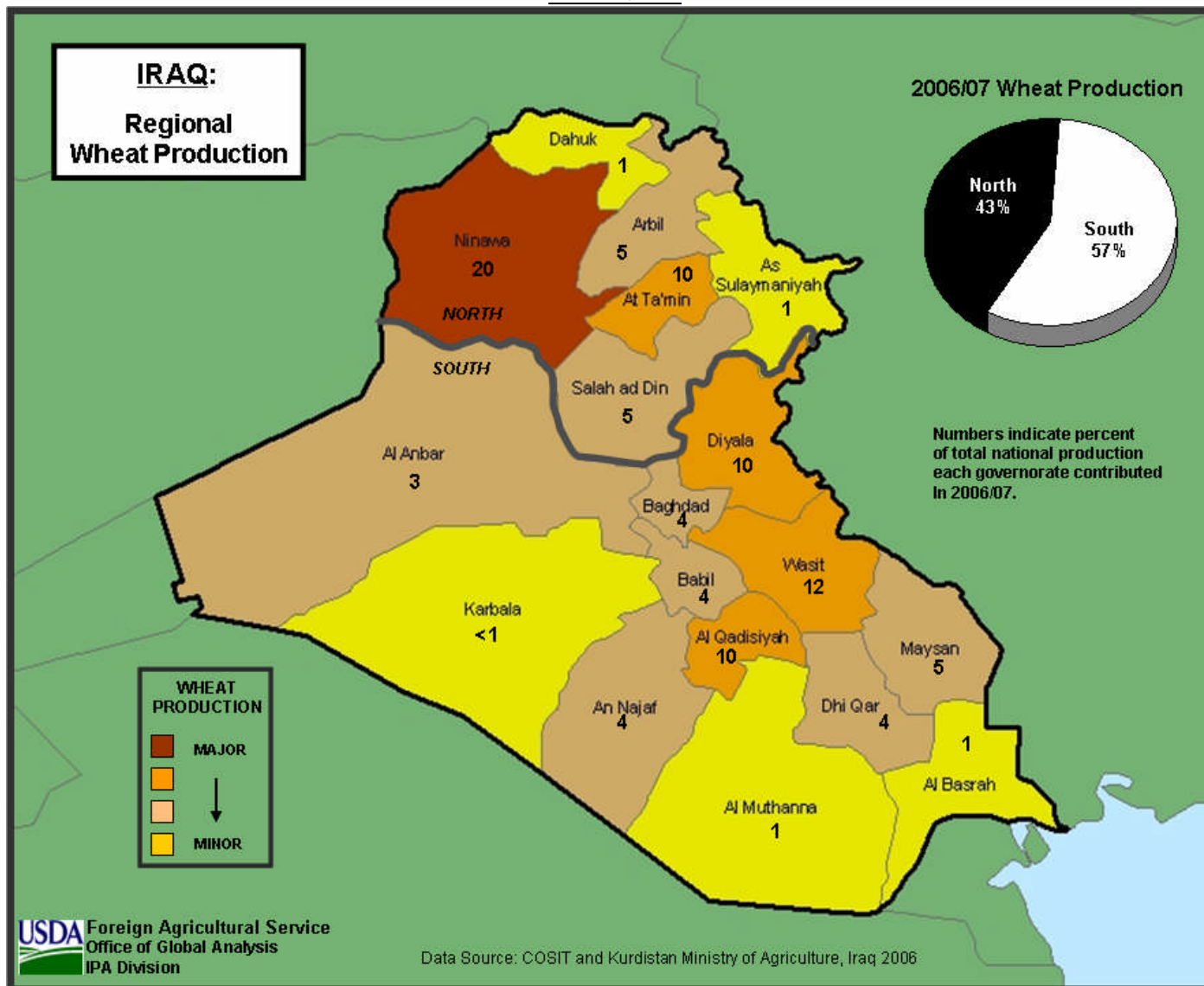
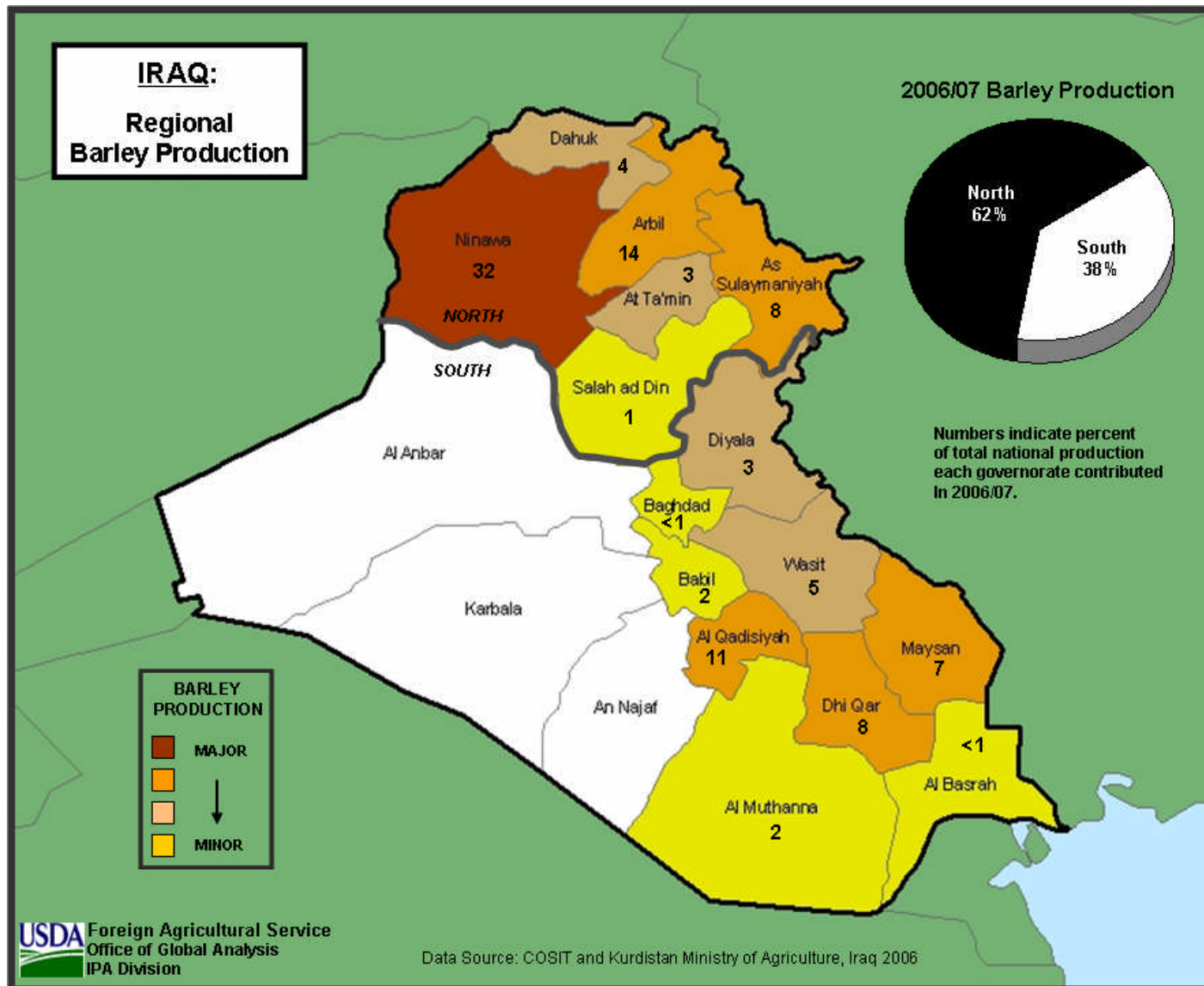


Figure A1. Percent of national wheat production broken down by agricultural region.

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Figure A2. Percent of national barley production broken down by agricultural region.

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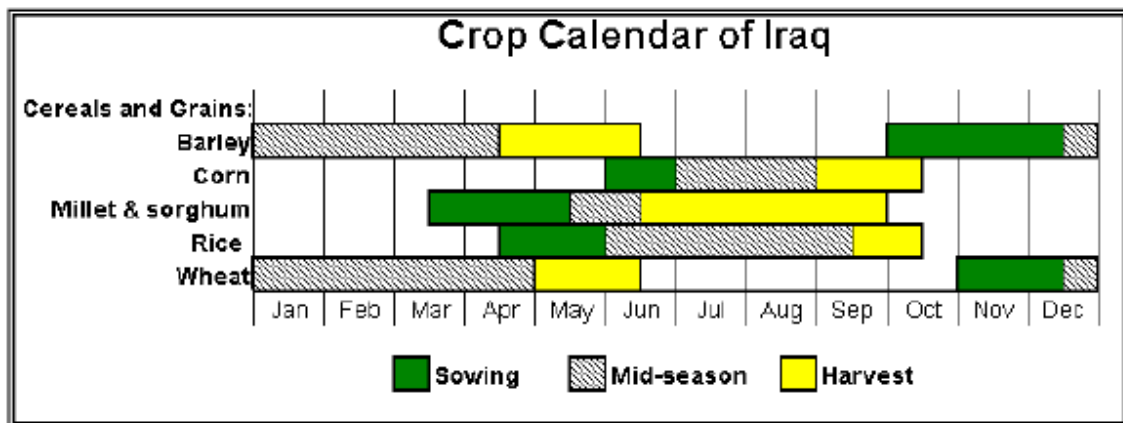
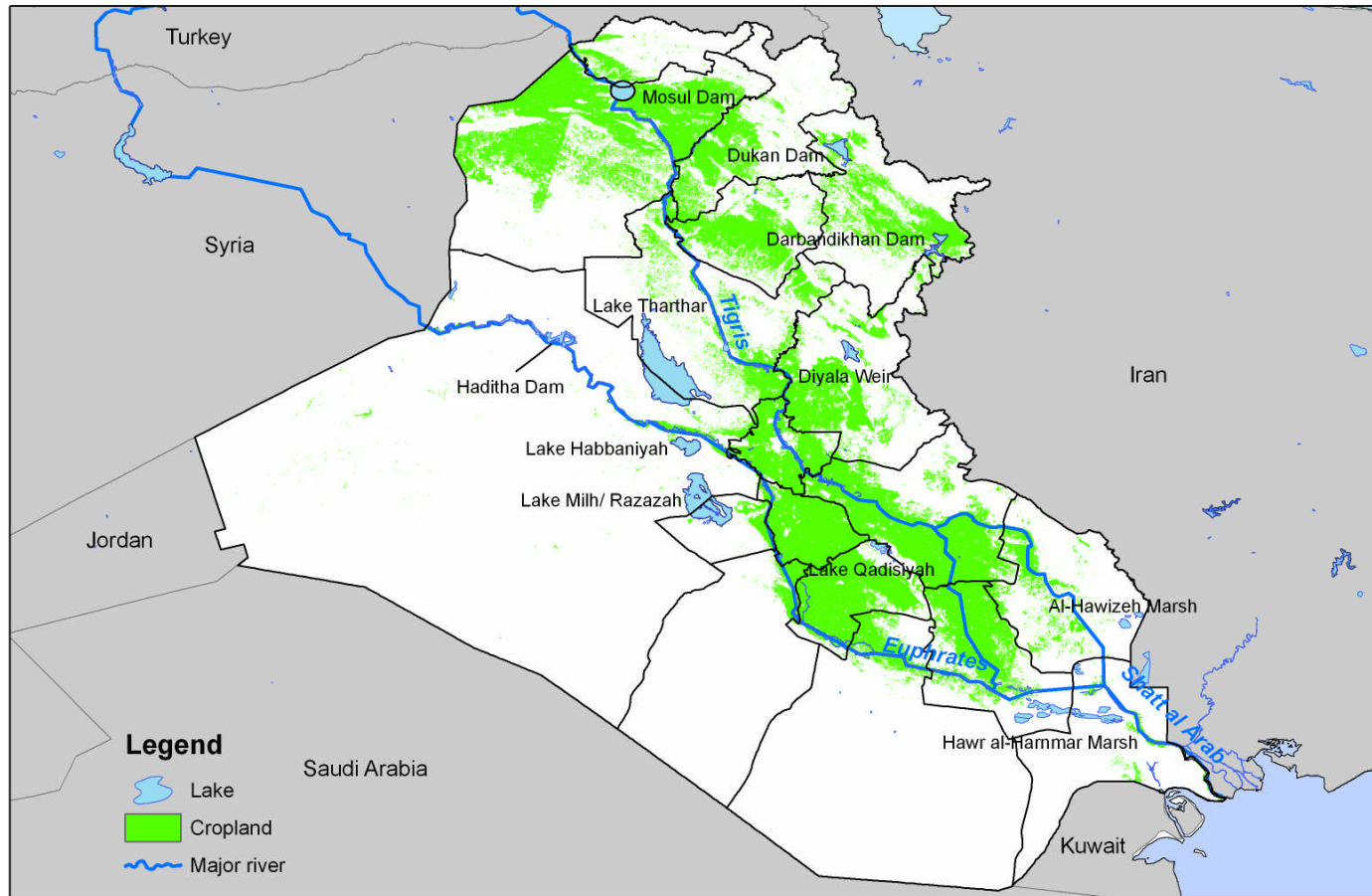


Figure A3. Crop calendar of Iraq.

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Aboveground water resources in Iraq



Data analysis by USDA/FAS/OGA/IPAD and ASRC Manegement Services



Figure A4. Major lakes and reservoirs in Iraq.

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